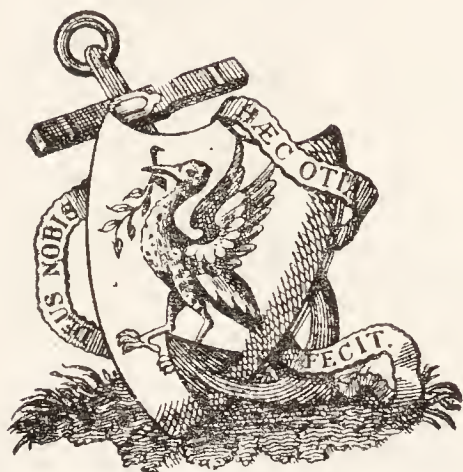


PORT OF LIVERPOOL



ANNUAL REPORT

OF THE

MEDICAL OFFICER OF HEALTH

TO THE

PORT SANITARY AUTHORITY

FOR THE YEAR

1929

BY

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INDEX.

	PAGE
Alien Examination	48
Analyst, City, Samples sent to	62
Anthrax	13
Bacteriologist, City, Samples sent to	62
Canal Boats	48
Clearances of Ships	50
Defects on Vessels	(facing) 47
Deratisation (on Ships and Docks)	25
Do. Certificates	29
Emigration	50
Epizootic Lymphadenitis	56
Food Importations—Supervision of	53
Hygiene of Crews' Spaces	45
Infectious Diseases	5
Do. do. Landed and Abroad	38
Inspection of Shipping	46
Malaria	17
Passenger Traffic of Port	5
Pilots and Masters, Instructions as to Infected Ports, etc.	6
Plague	17
Do. Occurrence of in Ports of the World	18
Port Hospital	7
Rats (Tables of Rats Caught, etc.)... ..	19 to 23
Rodents, Measures against	24
Seamen's Dispensary	40
Smallpox	9
Venereal diseases	39
Yellow Fever, Occurrence of in the Ports of the World	17
Transmigrants	49
TABLES { Shipping entering the port	4
Defects on vessels	(facing) 47
Vessels subjected to rat destruction	18
Rats obtained on ships and quays, caught, examined, or destroyed	19 to 23
Infectious disease landed in the Port and Abroad	38
Inspection of shipping	46
Summary of insanitary conditions	47
Insanitary conditions (number and nationalities of vessels)	(facing) 47
Samples sent to Analyst and Bacteriologist	62
Cattle, sheep and swine, from Ireland to Liverpool	63
Cattle landed and slaughtered at Birkenhead and Wallasey	64
Values of imports of meat, 1920 to 1928... ..	65, 72
Unsound meats supervised and utilised 1924 to 1929	66
Unsound offal supervised and utilised 1924 to 1929	66
Quantity and description of unsound meats supervised	67
Quantity and description of offal condemned	68
Unsound general food-stuffs supervised and utilised	69
Total quantities of different unsound food-stuffs supervised	71
Value of important food-stuffs imported into different Ports	72

PORT SANITARY AUTHORITY OF LIVERPOOL.

REPORT FOR THE YEAR 1929,

BY THE

MEDICAL OFFICER OF HEALTH.

The report of the operations of the Liverpool Port Sanitary Authority for the year 1929 is submitted herewith.

The report covers the work of the Authority during the year and includes an account of:—

(a) Measures adopted under the Cholera, Plague and Yellow Fever and Allied Orders of the Local Government Board, and under the Port Sanitary Authorities (Infectious Diseases) Regulations, 1920.

(b) The measures taken to reduce the number of rats on dock quays and in ships, and to ascertain the existence of plague among any such rats.

(c) The measures taken in regard to the sanitation of vessels.

(d) The inspection of imported foodstuffs under the Public Health (Imported Food) Regulations, etc.

(e) The medical inspection of aliens under the Aliens Order, 1920,

together with observations on various aspects of Port Sanitary Administration.

The Port of Liverpool trades with all parts of the world, and almost every conceivable kind of cargo is carried by Liverpool ships.

AMOUNT OF SHIPPING ENTERING THE PORT SANITARY DISTRICT DURING THE YEAR 1929.

Class of Vessels.	Number.	Tonnage.	Number Inspected.		Number reported to be defective.	Number of vessels on which defects were remedied.
			By the Medical Officer.	By the Sanitary Inspector.		
	(1)	(2)	(3)	(4)	(5)	(6)
SAILING FOREIGN—						
Steamers ...	7,156	13,586,583	999	3,652	709	694
*Motor ...	325	989,532				
Sailing ...	31	9,272				
Fishing ...	—	—				
TOTAL FOREIGN	7,512	14,585,387	999	3,652	709	694
SAILING COASTWISE—						4
Steamers ...	6,744	2,275,424	10	503	25	22
*Motor ...	1,531	235,361				
Sailing ...	86	11,063				
Fishing ...	—	—				
TOTAL COASTWISE	8,361	2,521,848	10	513	25	22
TOTAL FOREIGN AND COASTWISE	15,873	17,107,235	1,009	4,165	734	716

* (Includes mechanically-propelled vessels other than steamers.)
 Figures in columns 1 and 2 supplied by H.M. Collector of Customs for this Port.

Character of Trade of Port.
PASSENGER TRAFFIC DURING 1929.

No. of Passengers ...	1st Class.	2nd Class.	3rd Class.	Transmigrants.
Inwards	10265	19410	36925	3477
Outwards	20838	27027	65251	9637

Source of Water Supply.

The water used in the docks on the Liverpool side of the River Mersey is supplied by the Liverpool Corporation. Vessels in dock are supplied from hydrants from the same source, and vessels in docks on the Birkenhead side of the River Mersey are supplied with water by the Birkenhead Corporation and the Wallasey Corporation.

There are no water boats in use in the Port of Liverpool, all water being drawn from hydrants on the quayside.

Infectious Disease.

The measures adopted in Liverpool to prevent the importation of infectious disease from abroad are as follows :—

(1) The boarding by the assistant port medical officers of certain vessels on arrival in the river and before docking, viz. :—

(a) Vessels from certain parts of the world where dangerous infectious disease is known to exist.

(b) Vessels on which infectious disease exists at the time of arrival, or has occurred during the voyage.

(2) The visiting of *all* vessels in dock by sanitary inspectors as soon as possible after docking.

(3) The trapping of rats in ships and on quays and their examination for signs of plague infection.

(4) Co-operation with the officers of H.M. Customs, who report to the Port Sanitary Authority, if they obtain information of sickness on board vessels visited by them.

Information of the arrival of vessels which, under the regulations of the Port Sanitary Authority, must be boarded by the port medical officer before docking, is obtained through the assistance of the pilots. All vessels, except very small craft, must be navigated into the port by either a licensed pilot or a master or mate holding a Liverpool pilot's certificate, and willing assistance has always been given by the pilots in carrying out the regulations.

All pilots are supplied by the Liverpool Port Sanitary Authority with a book containing questions to be put to the master immediately on boarding, and also a list of infected ports where dangerous infectious disease is known to exist. These instructions, together with the list of infected ports, are amended from time to time, and at present are as follows :—

Port of Liverpool Sanitary Authority

To Pilots, and Masters of Inward Bound Vessels.

1. All Pilots should carry this booklet when on duty and immediately on boarding any inward bound ship should instruct the Master to read these directions carefully and to answer the following questions :—

- (i) Have you during the voyage had on board any case of INFECTIOUS DISEASE, or any sickness which may be of an infectious nature?
- (ii) Have you, within the previous two months called at any of the ports mentioned on the opposite page?

If the answer to either question is "Yes," or if the Master is in any doubt as to the nature of any sickness or the cause of any death which has occurred on board, the Pilot should instruct the Master as follows :—

(i) To send a wireless message to "STORM, LIVERPOOL," giving name of vessel, expected time of arrival in the Mersey, whether for Liverpool (North or South), Birkenhead, Garston or Manchester, and stating that the Doctor is required.

(ii) To report Formby Lightship for the Doctor.

(iii) To hoist the Quarantine Flag by day and the Quarantine Light by night.

NOTE.—The strict observance of the directions will greatly facilitate the clearance of vessels.

Pilots should, therefore :—

- (1) Carry out these directions in regard to every inward bound ship.
- (2) See that this booklet contains the latest list of infected Ports.
- (3) Immediately apply to the Port Sanitary Authority, Prince's Pier Head, Liverpool, if they lose this booklet.

LIST OF INFECTED PORTS.

SINGAPORE

JAVA PORTS

RANGOON

INDIAN PORTS

COLOMBO

ALEXANDRIA

BEYROUT

GRECIAN PORTS

MADAGASCAR

LAGOS

PERUVIAN PORTS

GUAYAQUIL

RIVER PLATE PORTS

&c., &c.

Other ports are added or deleted from time to time according to the prevalence of disease.

PORT SANITARY AUTHORITY.

A medical officer is available both day and night for the purpose of boarding, by means of the boarding launch "Moyles," incoming vessels from infected ports, or vessels which have cases of infectious disease on board at the time of arrival. During the year 762 vessels were boarded in the river by the assistant port medical officers, and in addition 237 vessels were visited for the purpose of alien and other inspection. All vessels, whether from infected ports or not, arriving in Liverpool are visited as soon as possible after docking by a sanitary inspector, who enquires into the occurrence of any sickness during the voyage, and if necessary communicates with the port medical officer.

The deratisation or deratisation exemption certificate (whichever the case may be) is examined, and if found to be in order the inspector proceeds to the examination of the sanitary condition of the vessel, pointing out any defects and suggesting the remedy to be adopted. It has been found that the shipping companies are always ready and willing to remedy any defects in their vessels which have been pointed out to them by the port sanitary inspectors.

Arrangements for disposal of cases of Infectious Disease and for observation or surveillance of contacts.

Cases of smallpox, plague, cholera or yellow fever are removed from the vessel before docking by the M.L. "Moyles," and conveyed to the Port Sanitary Hospital, New Ferry, by water. Cases of infectious disease other than the above are removed, usually after the vessel docks, to one of the city hospitals by means of the Health Committee's motor ambulances. Contacts of infectious cases, if not removed to hospital, and living at addresses in the city, are kept under observation by the city sanitary inspectors, and in the event of any contact proceeding to an address outside the city, the medical officer of health of the district concerned is advised.

The Port Isolation Hospital.

The Isolation Hospital was erected in 1877 at New Ferry, in the County of Cheshire, on land adjoining the River Mersey, and close to the quarantine station in the Sloyne anchorage ground. A slipway extends from the hospital to the water edge, and is available for the landing of patients from half-tide to high water.

The hospital is well placed for the admission of cases from the river, and it is also quite convenient of access by road, being less than a quarter of a mile away from a main road.

The hospital was extended in 1901 and 1902 by the addition of a new pavilion, a suitable laundry and steam disinfecter, also additional nurses' quarters.

The premises are chiefly used for the isolation of sea-borne cases of infectious disease, but from time to time cases have been received on behalf of neighbouring authorities, under special agreement, when accommodation has been available.

On the other hand, owing to the different types of infectious disease occurring on vessels coming into the Mersey, and the necessity for providing separate accommodation for men, women and children, it has been advantageous to admit cases of ordinary infection to the City Hospitals where cases of a similar character are already accommodated.

Arrangements for disinfection of Infected Quarters, Bedding, Clothing, etc.

Infected quarters are disinfected as soon as possible by means of liquid sulphur dioxide (sulphume) or by spraying with disinfectant: the bedding, clothing, etc., are removed by vans to the Charter Street disinfecting station and there disinfected by steam.

Arrangements for Cleansing of Persons.

This is carried out at either the City Hospital, Sparrow Hall, or the City Hospital North, Netherfield Road, to which the patients are conveyed by motor ambulance.

Arrangements for Ambulance Transport.

The motor ambulances of the Liverpool Corporation are available for this purpose.

Arrangements for detection and treatment of Venereal Disease among sailors,

Careful enquiries are made by the boarding medical officers and the port sanitary inspectors into the history of cases that may have been

reported during the voyage. This is usually obtained from responsible officers of the ship, e.g., captain or engineer.

Leaflets, stating the times of attendance at the various venereal disease clinics in the city, are distributed freely to masters of vessels; treatment at these clinics is obtained free of cost to the patient, and in all instances the masters of vessels are advised to arrange for the attendance of the patient at one of the clinics.

Arrangements for bacteriological examination of rats.

The systematic examination of rats caught by the Port Sanitary staff is carried out by the Liverpool City Bacteriologist.

During the year 4,615 rats were examined for possible plague infection, 3,392 being from ships, and 1,223 from the sheds and quays at the docks.

Smallpox.

One case of smallpox was landed during the year. The circumstances of the arrival are interesting.

The s.s. "Tuscania" had been in the port of Bombay, where severe smallpox was prevalent, for a period of ten days. The vessel sailed on March 14th, 1929, the ports of call were Suez and Port Said (March 22nd), Marseilles (March 27th), and Gibraltar (March 29th), Liverpool (April 1st) and Glasgow (April 4th).

The ship's surgeon stated that a seaman reported sick on March 17th, complaining of general malaise and septic condition of tonsils; on 20th March the patient developed an erythematous rash, chiefly on face, back and forearms; later, blisters appeared on the forearms and soles of the feet. The patient was placed in the general hospital and was examined by the Quarantine Medical Officer at Marseilles, who diagnosed the condition as toxic erythema.

On the fourth day (March 18th), after leaving Bombay, a greaser reported sick with general malaise and temperature, and on the 20th a vesicular and pustular rash appeared on the face and other parts. This

case was seen at Suez by the Quarantine Medical Officer, who concurred in the diagnosis of chickenpox.

The seaman's illness became more acute, and it was found necessary to remove him to hospital on arrival at Marseilles. He died soon after admission, the case being finally diagnosed as hæmorrhagic smallpox. By the time the diagnosis was made the vessel had sailed after landing 450 passengers at Marseilles, the information was, however, sent by wireless to the ship, and the ship's surgeon at once proceeded to vaccinate the crew and passengers; this had practically been completed when the vessel arrived at Liverpool.

The "Tuscania" arrived at Liverpool on April 1st, and was boarded by the assistant port medical officers, the patient isolated as chickenpox was diagnosed as a case of smallpox, and was immediately removed to the Port Isolation Hospital, along with his three immediate contacts. All passengers and crew on board the ship were carefully examined by the assistant port medical officers for evidences of smallpox, but none were found. A list of all passengers and crew (totalling 900) was obtained, and the medical officers of health of the districts to which they proceeded were notified.

The names and destinations of 404 passengers who were disembarked at Marseilles and proceeded overland to England were also sent to the medical officers of health of the districts concerned.

In view of the delay in vaccinating and re-vaccinating the contacts at sea, the occurrence of some further cases was to be expected about that date.

The vessel left Liverpool and arrived at Glasgow on April 4th. On the day of arrival at Glasgow, and subsequently at other towns further cases of smallpox were discovered amongst the crew and passengers. A total of 53 cases (including the two ill on the ship) was reported, of which 47 were ill or contracted smallpox on the ship, and there were six later infections. Twelve of the cases, including the patient at Marseilles, proved fatal.

It is interesting to note that no more than six secondary cases occurred, testifying to the thoroughness of the administrative work

of the Port Sanitary and Health Authorities of the country; there seems to have been very little difficulty in securing the necessary vaccination and supervision of contacts.

The outbreak proved that the importation into this country of virulent smallpox is still a strong possibility, the type is very infectious and extremely fatal, as twelve deaths in fifty-three cases (22 per cent.) fully proves.

This possibility prompted the Liverpool Port Medical Officer to issue a notice in the early part of 1929 to shipowners and others to inform them of the prevalence of smallpox of a severe type in Eastern Ports. It was pointed out that it was most essential that the crews of vessels should be recently vaccinated or re-vaccinated; that cases of the disease may also occur amongst passengers, and it was therefore desirable that the ships' surgeons should have a stock of fresh and reliable lymph available, and that the vaccine should be stored on board at a low temperature.

S.S. "APPAM."—On Saturday, April 27th, 1929, a wire was received from Plymouth stating that the S.S. "Appam" had left that port for Liverpool, and that a case of smallpox had been landed at Calabar. The vessel arrived in the Mersey on Sunday, April 28th, 1929, the records were examined and the crew and passengers medically inspected. The ship's surgeon reported that a native trimmer first reported sick on April 5th, 1929. On April 7th he was found to have a pustular rash on the face, chest, arms and back. The case was diagnosed by the ship's surgeon as one of smallpox, and this was confirmed by the port medical officer at Calabar. The patient was removed to hospital with his effects. The quarters were disinfected by the Port Authorities at Calabar, and all immediate contacts vaccinated forthwith. The patient's bed and bedding were dumped overboard. On arrival at Liverpool all passengers and crew were examined carefully, and vaccination was offered to everybody not already vaccinated. Five passengers and twenty-three of the crew were vaccinated by the assistant port medical officers. The names and addresses of destinations of passengers and crew were obtained, and were forwarded to the medical officer of health of the districts of destination. No further cases were discovered at the examination.

S.S. "ANDANIA."—This vessel arrived in the Mersey from New York on March 29th, 1929, and was boarded in the river by the medical officer. The ship's surgeon reported that a 3rd-class passenger boarded the vessel at Liverpool on the outward voyage, February 15th, 1929, and was vaccinated on that date. The vaccination was successful.

On February 20th, 1929, at the medical examination, he was found to be quite well, but on February 22nd, 1929, he was found to have an eruption which was papular and vesicular, and mainly distributed about the face and trunk. The hands and feet were free, and the temperature normal. The ship's surgeon diagnosed chickenpox. The patient was isolated, together with two contacts, and on arrival at Halifax they were transferred to hospital, where a diagnosis of smallpox was made. The patient's cabin, hospital and bedding were disinfected on board. No further cases occurred. As the incubation period had expired by the time the vessel reached Liverpool no further action was taken.

S.S. "DORIC."—This vessel arrived in the River Mersey on April 15th, 1929, from Halifax. The ship's surgeon reported that on the outward voyage a third-class passenger developed chickenpox. The quarantine authorities at Halifax diagnosed mild smallpox, and removed the patient to hospital. All persons on board were vaccinated, the necessary fumigation and disinfection were carried out, and all contacts landed in quarantine.

No further action was necessary on arrival at this port.

S.S. "ASSYRIA."—This vessel arrived in the Mersey on Sunday, May 26th, 1929, from Bombay, and was boarded immediately by the assistant port medical officers, and the crew and passengers medically inspected. The ship's surgeon reported that a third-class passenger, who had joined the vessel at Bombay on April 30th, 1929, was first reported sick on May 10th, 1929. On May 11th he was found to have a rash on the body and other parts. The ship's surgeon diagnosed chickenpox. At Suez the case was removed to hospital by the authorities as suspected smallpox. All persons on board had been either vaccinated or re-vaccinated just before joining the vessel at

Bombay or were vaccinated on board. Passengers who joined the vessel at Marseilles and Gibraltar were also offered vaccination, but the majority did not avail themselves of this offer.

The hospital and quarters occupied by the patient were disinfected immediately the patient left the vessel. No further cases occurred and all persons on board were well on arrival. From the history and distribution of the rash, the case may probably have been one of chickenpox. The patient, aged 6 years, was vaccinated successfully in infancy, and had been re-vaccinated three days before joining the vessel at Bombay. The re-vaccination was negative. No further action was taken.

In the case of three other vessels which had left smallpox patients elsewhere the incubation period had expired before the arrival of the vessels at Liverpool, so that it was only necessary to carefully inspect all persons on board to ensure that no secondary cases had been overlooked.

Anthrax.

During the year 1929 there were approximately 1,841,534 salted and dry hides and skins imported into the Port of Liverpool from various foreign countries; there were also imported approximately 335,340 packages of wool, of which the large bulk was East Indian. The importation of these large amounts of animal products, which are handled in transit to stores or manufactories, has associated with it the risk of human infection with the anthrax bacillus, causing a condition known as malignant pustule or cutaneous anthrax.

During the year 1929, nine cases of this disease were notified to the Health Department and admitted to Liverpool City Hospitals. Of these patients only four were associated with work in Liverpool, one lived in Bootle, whilst four came from Runcorn, where three of them had been engaged in various processes of the tanning industry; another case from the same district was an infant, aged 15 months, infected on the arm, and was the child of a tannery worker.

Special arrangements have been made for the treatment of cases coming from districts outside Liverpool.

The site of the pustule was usually on an exposed part of the person, either the face (2), neck (4), or arms (3).

The occupations followed were as follows:—Two were dock labourers engaged in the discharge of ships, landing dry hides from South America, &c.; three were engaged in handling East Indian wool, one a sampler in the Dock Board Wool Warehouse and two wool conditioners engaged by a local firm in sorting, blending and packing East Indian wool (Vicanere). Four patients were sent in from Runcorn, and of these, three were employed in tanneries and had handled hides from Madagascar, Abyssinia, China, &c. The remaining Runcorn case was a child, aged 15 months, the daughter of a tannery worker. This man, curiously, had been treated for anthrax in Fazakerley Hospital a few months previously (24th December, 1928). It is possible for infected dust to have been carried by the father from his work, either on his clothes or fingers, and for the anthrax germ to have been accidentally inoculated into the skin of the arm of the child. This child recovered. There were three deaths.

Favourable reports on the results of serum treatment are now being obtained at the City Hospital, Fazakerley, where cases come under observation soon after infection and the diagnosis can be promptly verified. It is, therefore, the wish of the Health Authorities that cases or suspected cases of anthrax be sent without delay to this hospital for admission, when the necessary steps will be taken to diagnose the illness and place the patient under serum treatment.

Under this arrangement during 1929, 43 persons suspecting that they were infected with or developing anthrax came or were sent to this hospital; of these, three proved to be genuine cases and were admitted for treatment.

The fatal cases quoted emphasise the importance of early diagnosis and serum treatment in all cases of this disease.

The business firms connected with the hide and skin trade in Liverpool and neighbourhood have recognised the importance of the points above enumerated in regard to early diagnosis and serum treatment, and have conferred with the Liverpool Health Authorities with the object of taking further measures to educate the workers as to the risks involved in handling goods of animal origin, particularly hides and skins.

A poster has been printed on the subject and will be affixed in suitable places. A pocket card has also been issued containing full information regarding the appearance and symptoms of cutaneous anthrax and advice on the action to be taken. Arrangements were also made to admit all cases of anthrax or suspected anthrax direct to Fazakerley hospital.

The question of the disinfection of hides and skins is still under consideration, but there are difficulties in evolving a method which will be successful, not only in destroying the anthrax spore without damaging the material, but one which can be utilised on a commercial scale.

In order to eliminate as far as possible the handling by dock labourers and others, the hide trade connected with this Port have agreed not to open bales of China hides at the docks beyond what is necessary for sampling purposes.

The disinfection of imported dangerous wools at the Government Wool Disinfection Station, Love Lane, is still in progress, and the Liverpool Port Sanitary Authorities assist by having samples of the untreated wools and those which have passed through the disinfecting process, examined by the City Bacteriologist; this helps to confirm and control the Duckering disinfecting process. During the year, 40

samples were examined after disinfection, and all were found to be free from anthrax.

The Ministry of Agriculture has drawn attention to the danger to farm animals in Great Britain in connection with the shipment in foreign ports of commodities containing the spores of anthrax. The disease is prevalent in animals in many parts of the world from which supplies of raw hides, hair, wool and feeding stuffs, e.g., cattle cake and the ingredients thereof, are drawn. Infection is conveyed to the farm by means of these and other animal substances from foreign countries, especially those places where inadequate precautions are taken or where none exist.

Anthrax spores may be shaken from the above-mentioned animal products and may become mixed with foodstuffs or hold-sweepings, and thus infection may be indirectly conveyed to animals of the farm.

The suggestion is made that special precautions should be adopted so that dried hides, wool, hair, &c., should not be carried, mixed with, or be placed on top of grain or feeding stuffs, and that the holds which have contained animal products of this nature should be thoroughly disinfected; further, that the sweepings of holds containing grain, etc., should not be mixed with other foodstuffs.

The Ministry of Agriculture recommend the following process for disinfection :—

“Thoroughly sprinkle the compartment to be disinfected with an antiseptic solution to prevent the raising of dust. Sweep down the sides and floors; carefully collect all dust and refuse therefrom and destroy by fire. Then wash the sides and floors with strong solution of miscible carbolic acid (not less than 5 per cent. of acid) or a 3 per cent. solution of formalin, which contains not less than 40 per cent. of formaldehyde. Persons employed on the work should wear india-rubber gloves as a protection against inoculation, and also respirators.”

The spores of anthrax bacillus have great resisting power, and may remain active for years unless measures are taken to destroy them.

TABLE GIVING PARTICULARS OF THE INCIDENCE OF ANTHRAX CASES IN THE UNITED KINGDOM, NOTIFIED TO THE CHIEF INSPECTOR OF FACTORIES, UNDER SECTION 73 OF THE FACTORY AND WORK-SHOP ACT, 1901.

ANTHRAX.	1928	1927	1926	1925	1920	1910	1900
Cases Notified ...	*45-(8)	31-(2)	38-(3)	45-(9)	48-(11)	51-(9)	37-(7)
Wool ...	14-(2)	18-(1)	15-(2)	25-(4)	25-(7)	28-(3)	10-(2)
Horsehair ...	4-(1)	3-(1)	8-(1)	3-(2)	5-(1)	6-(1)	12-(3)
Hides and Skins ...	24-(3)	9	12	16-(3)	17-(3)	14-(3)	9-(1)
Other Industries ...	3-(2)	1	3	1	1	3-(2)	6-(1)

Extracted from the Annual Report of the Chief Inspector of Factories for the year 1928.

*The principal figures relate to cases and the bracketed figures to deaths.

Malaria.

During the year 1929 there were 71 new cases of malarial fever, which were either landed here or had recovered abroad on 31 vessels; the names and addresses of the patients, with particulars of the treatment and dosage of quinine given, together with the movements of the vessels, were forwarded to the Ministry of Health.

Yellow Fever.

Two vessels on arrival at Liverpool reported having landed cases of yellow fever during the voyage.

S.S. "PORTSEA."—This vessel arrived at Liverpool on May 14th, 1929. The master reported that one case of yellow fever had been removed to hospital at Santos. The vessel was fumigated throughout and no further cases occurred.

S.S. "MARIA DE LARRINAGA."—This vessel arrived at Liverpool on June 17th, 1929, and the master reported that two members of the crew were landed at Rio de Janeiro on March 16th, 1929, suffering from yellow fever. Both cases were reported subsequently as not suffering from yellow fever.

Plague.

No case of human plague was landed in Liverpool during the year.

No rodent plague was discovered among the rat population during the year, either in ships or on the quays.

PARTICULARS RELATING TO PLAGUE "INFECTED" OR "SUSPECTED" VESSELS ARRIVING IN THE PORT DURING 1929.

Name of Vessel.	Date of Arrival.	Whether "Infected" or "Suspected."	Methods of Rat Destruction Employed.	Number of Dead Rats Recovered.		Whether a Certificate of Deratisation was Issued.	Remarks.
—	—	—	—	—	—	—	—

MEASURES OF RAT DESTRUCTION ON VESSELS FROM PLAGUE INFECTED PORTS (OTHER THAN THOSE INCLUDED IN ABOVE) ARRIVING IN THE PORT DURING 1929, AND NUMBER OF CERTIFICATES ISSUED IN RESPECT OF SUCH VESSELS.

Total Vessels from Plague Infected Ports.	Number of such Vessels Fumigated by S.O ₂ .	Number of Dead Rats Recovered.	Number of such Vessels Fumigated by H.C.N.	Number of Dead Rats Recovered.		Number of such Vessels on which Trapping, etc., were Employed.	Number of Dead Rats Recovered.	Number of such Vessels on which Measures of Rat Destruction were not carried out.	Number of Fumigation Certificates Issued on Form 11.		Number of other Certificates Issued.
				Rats.	Mice.				Deratisation.	Exemption.	
663	98 (one vessel part H.C.N.)	Rats. 1931 Mice. 125	10 (one vessel part S.O ₂ .)	Rats. 66 Mice. 3		648	Rats. 2738 Mice. 22	15	109	28	—

MEASURES OF RAT DESTRUCTION ON VESSELS OTHER THAN THOSE IN ABOVE TABLES, AND NUMBER OF CERTIFICATES ISSUED IN RESPECT OF SUCH VESSELS DURING 1929.

Number of Vessels Fumigated by S.O ₂ .	Number of Dead Rats Recovered.	Number of Vessels Fumigated by H.C.N.	Number of Dead Rats Recovered.		Number of Vessels on which Trapping, etc., were Employed.	Number of Dead Rats Recovered.		Number of Certificates Issued on Form "Port 11."		Number of other Certificates Issued.
			Rats.	Mice.		Rats.	Mice.	Deratisation.	Exemption.	
93	Rats. 509 Mice. 80	22	Rats. 111 Mice. 31		235	Rats. 1418 Mice. 2		114	84	—

TABLE SHOWING THE NUMBER OF RATS AND MICE OBTAINED ON SHIPS AND QUAYS
BY THE AUTHORITY'S RAT-CATCHERS DURING THE YEARS 1920-1929.

Year.	NUMBER OBTAINED.			NUMBER EXAMINED.			NUMBER DESTROYED.		
	From Ships.	From Quays.	Total.	From Ships.	From Quays.	Total.	From Ships.	From Quays.	Total.
1920	8,088	1,593	9,681	5,276	1,517	6,793	2,812	76	2,888
1921	8,867	2,405	11,272	5,031	2,195	7,226	3,836	210	4,046
1922	10,642	2,830	13,472	5,520	2,519	8,039	5,122	311	5,433
1923	12,097	1,625	13,722	5,629	1,460	7,089	6,466	167	6,633
1924	13,509	1,963	15,472	4,981	1,658	6,639	8,528	305	8,833
1925	11,088	2,508	13,596	4,882	2,065	6,947	6,206	443	6,649
1926	8,827	2,800	11,627	4,493	2,312	6,805	4,334	488	4,822
1927	8,134	2,496	10,630	4,836	1,945	6,781	3,298	551	3,849
1928	7,351	2,414	9,765	4,145	1,918	6,063	3,206	496	3,702
1929	*7,036	1,456	8,492	3,408	1,271	4,679	3,628	185	3,813
Total.....	95,639	22,090	117,729	48,201	18,860	67,061	47,436	3,232	50,668

* 314 mice are included in these figures.

NUMBER AND SPECIES OF RATS CAUGHT, IN THE CITY AND PORT OF LIVERPOOL,
DURING THE YEAR 1929.

1929.	Warehouses.		Sewers.		Other Places.		Total.		Ships.		Quays.		Other Sources.		Total.	
	Black.	Brown.	Black.	Brown.	Black.	Brown.	Black.	Brown.	Black.	Brown.	Black.	Brown.	Black.	Brown.	Black.	Brown.
January ...	179	153	—	492	20	371	199	1,016	452	—	93	6	42	3	587	9
February ...	123	225	—	390	41	410	164	1,025	398	—	46	2	7	5	451	7
March ...	105	213	—	448	15	453	120	1,114	367	—	89	9	10	1	466	10
April ...	162	215	—	504	1	377	163	1,096	923	—	48	5	61	9	1,032	14
May ...	188	377	—	517	2	446	190	1,340	834	1	9	6	15	—	948	7
June ...	124	238	—	521	16	468	140	1,227	663	—	75	3	20	—	758	3
July ...	135	322	—	533	38	579	173	1,434	612	—	66	2	40	2	718	4
August ...	156	165	—	407	44	357	200	929	310	6	113	9	48	1	471	16
September ...	138	308	—	517	33	547	171	1,372	627	—	66	3	18	3	711	6
October ...	174	349	—	608	13	482	187	1,439	474	2	80	1	35	3	589	6
November ...	90	356	—	622	25	428	115	1,406	591	—	108	3	50	2	749	5
December ...	102	275	—	454	22	325	124	1,054	513	—	55	3	40	—	608	3
TOTAL ...	1,676	3,196	—	6,013	270	5,243	1,946	14,452	6,764	9	938	52	386	29	8,088	90

NUMBER AND SPECIES OF RATS EXAMINED OR DESTROYED IN THE CITY AND PORT OF LIVERPOOL,
DURING THE YEAR 1929.

1929.	Examined (City).		Destroyed (City)		Examined (Port).		Destroyed (Port).		Total Caught.
	Black.	Brown.	Black.	Brown.	Black.	Brown.	Black.	Brown.	City and Port.
									Black and Brown.
January ...	52	272	147	744	364	9	223	—	1,811
February ...	53	243	111	782	346	7	105	—	1,647
March ...	28	278	92	836	361	10	105	—	1,710
April ...	39	280	124	816	604	14	428	—	2,305
May ...	50	302	140	1,038	492	7	456	—	2,485
June ...	32	291	108	936	338	3	420	—	2,128
July ...	56	320	117	1,114	325	3	393	1	2,329
August ...	38	232	162	697	347	13	124	3	1,616
September ...	45	326	126	1,046	364	6	347	—	2,260
October ...	40	363	147	1,076	332	5	257	1	2,221
November ...	38	326	77	1,080	406	5	343	—	2,275
December ...	40	240	84	814	253	1	355	2	1,789
TOTAL ...	511	3,473	1,435	10,979	4,532	83	3,556	7	24,576

RATS DESTROYED DURING 1929.

(1) ON VESSELS.

	Jan.	Feb.	Mar.	April.	May.	June	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Total.
Black	452	398	367	923	834	663	612	310	627	474	591	513	6,764
Brown	—	—	—	—	1	—	—	6	—	2	—	—	9
Rats examined ...	250	294	271	505	391	268	226	217	283	245	273	169	3,392
Rats found infected with Plague	—	—	—	—	—	—	—	—	—	—	—	—	—

(2) QUAYS, WHARVES AND WAREHOUSES.

	Jan.	Feb.	Mar.	April.	May.	June	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Total.
Black	135	53	99	109	114	95	106	161	84	115	158	95	1,324
Brown	9	7	10	14	6	3	4	10	6	4	5	3	81
Rats examined ...	123	59	100	113	108	73	102	143	87	92	138	85	1,223
Rats found infected with Plague	—	—	—	—	—	—	—	—	—	—	—	—	—

Number of Mice destroyed on vessels	...	...	...	...	263
Do. do. do. on quays	...	...	...	...	51
Do. do. examined on vessels and quays	...	...	...	...	64

The combined returns of all rats and mice caught and destroyed by shipping firms employing their own rat-catchers, by rat-catching companies, and by the Public Health Authorities, during the year 1929, are as follows:—

				Rats.	Mice.	Rats.	Mice
PORT—							
In vessels	...	...	...	22,369	263		
On quays	...	...	...	1,405	51		
						23,774	314
CITY—							
In warehouses	...	...	...	4,872	—		
In sewers and from other sources	...			11,526	18		
						16,398	18
					TOTAL	40,172	332

Number of Visits to	Vessels	by Rat Catchers	...	...	6,018
Do.	do.	do.	Rat Searchers	...	3,438
Do.	do.	Quays, Sheds, etc.,	by Inspectors	...	336
Do.	do.	do.	do.	Rat Searchers	935
Do.	do.	do.	do.	Rat Catchers	9,577

Measures against Rodents.

Steps taken for detection of rodent plague.

Liverpool trades extensively with many ports where plague is always present. All vessels arriving from such ports are boarded, the passengers and crews are examined and careful enquiry made as to any evidence of the existence of plague among the rats on board. Medical inspection alone is not sufficient, as rodent plague may exist on board without having given rise to any human cases, and without any sick or dead rats having been seen. Consequently, as soon as the vessel berths, it is necessary—

- (1) to catch samples of the rat population in all parts of the vessel;
- (2) to examine the vessel in all parts, and at various times during the discharge of cargo, for sick or dead rats.

All rats so obtained are sent to the city bacteriologist for examination for plague infection.

Samples of the rat population from the dock quays, sheds and warehouses are obtained daily, and all rats so caught are submitted to the city bacteriologist for examination. The success of plague preventive measures depends entirely on the detection of the infection at the earliest possible moment, followed by the adoption of energetic measures to destroy every infected rat. Rodent plague when once established is most difficult to eradicate, and in addition to the possibility of causing human cases, it leads to the imposition of restrictions on our ships in foreign ports. In order that this work may be carried out efficiently the Port Sanitary Authority employs a staff of eleven full-time rat-catchers and rat-searchers, and one part-time rat-catcher.

Measures taken to prevent the passage of rats between ships and shore.

All vessels with the exception of coastwise vessels must have rat-guards affixed to their moorings during their stay in the port. The rat-guard used and approved of by the Port Sanitary Authority consists of a disc of galvanised sheet iron, 1/16 in. thick and three feet in diameter. The edge is left raw, i.e., not wired or turned over. In the lower half is cut a door hinged and so fastened when shut that no

foothold is afforded to rats. The door slit leads to the central hole through which the rope passes. Round the central hole is placed a strong collar projecting about 4 in. on each side and riveted to the disc. In the collar is a strong steel spring clip, which can be adjusted by means of a winged nut and bolt. To apply the guard, the door is opened and the guard put over the rope so that the latter passes up into the central hole, where a little force is necessary to overcome the spring of the clip. The guard will now hold quite firmly and the bolt and screw closing the opening of the clip gives additional security. The door is then closed and fastened, the upper edge being fitted with a piece of thick sheet rubber attached so as to close completely the central hole whatever the size of rope in use.

When vessels loaded with cargo are infected with either human or rodent plague the following procedure is adopted in order to prevent the passage of rats from the ship to the shore :—

If the vessel is infected a preliminary fumigation may be undertaken to destroy the rats, the nature of the cargo would, however, determine this. The measures enumerated below are enforced pending discharge of cargo, when a complete and thorough deratisation takes place.

(a) The vessel is breasted off six feet from the quayside.

(b) Rat-guards are adjusted on all moorings.

(c) One gangway only is allowed, and a watchman is stationed on it from sunrise to sunset.

(d) The gangway must be lifted at sunset and not lowered until sunrise.

(e) The cargo may be discharged under supervision of the Port Sanitary staff.

(f) Trapping and examination of rats caught in the neighbouring sheds.

Methods of Deratisation of Ships.

Deratisation of ships is carried out by fumigation with either sulphur dioxide or hydrocyanic acid gas. Fumigations in the Port of Liverpool are carried out as a rule by private firms under the super-

vision of the Port Sanitary Authority. At least twenty-four hours' notice in writing must be given to the Port Sanitary Authority before the commencement of any fumigation. This notice must be on the official form, which sets out the cubic capacities of the spaces and the fumigant to be used.

DERATISATION BY MEANS OF SULPHUR DIOXIDE GAS.

(1) Sulphur dioxide. This gas is generated by burning sulphur in buckets. Only sulphur of good quality must be used, and not more than 9 lbs. of sulphur to each bucket, 3 lbs. of sulphur to every 1,000 cubic feet of air space is required, with a minimum time of exposure of six hours. In order to ensure that the whole of the sulphur is burned, it is advisable that a small quantity of wood, wool or shavings dipped in methylated spirit should be added to each receptacle.

(2) Liquid sulphur dioxide (sulphume). 6 lbs. of liquefied gas are required for every 1,000 cubic feet of air space, with a minimum time of exposure of six hours.

DERATISATION BY MEANS OF HYDROGEN CYANIDE.

Fumigation of vessels by means of this gas is exceedingly dangerous to human life, and may only be carried out by firms which have a specially trained staff and the necessary life saving appliances.

(1) Liquid hydrogen cyanide. The hydrogen cyanide gas is generated by the vaporisation of liquid hydrogen cyanide, the latter being contained in steel cylinders.

For holds, provision store rooms and peaks, 2 oz. per 1,000 cubic feet of air space is required, and for living quarters, superstructures and other spaces not used for stores, 1 oz. per 1,000 cubic feet. The minimum time of exposure in both cases is two hours.

(2) Zyklon B. is kieselguhr, a very absorbent infusorial earth impregnated with a mixture of hydrogen cyanide ($97\frac{1}{2}$ per cent.) and tear gas ($2\frac{1}{2}$ per cent.). The mixture is packed in strong hermetically sealed tins or canisters containing 500, 1,000, 1,200 and 1,500 grammes of cyanogen. These canisters are placed near the holds in numbers necessary for fumigation of the particular cubic capacity. Each tin

is opened by a special apparatus which prevents the escape of gas during the process. On removal of the lid, a thin rubber cap is placed over each tin unless the contents are to be used immediately.

When fumigation is started the tarpaulins covering the hatches are raised and the contents of the required number of tins are scattered over the bottom of the hold from the deck. The tarpaulin is then replaced and the hold closed for two hours. At the end of that time the hold is opened up and ventilated.

For holds, provision store rooms and peaks, 50 grammes of H.C.N. content per 1,000 cubic feet is required, and for living quarters and superstructures not used as storerooms 25 grammes per 1,000 cubic feet.

Two new methods of fumigation of vessels were tested by the Port Sanitary Authority during the year.

(1) LIQUID HYDROGEN CYANIDE (Gallarde process).

By this process the gas is liberated from a stabilised liquid hydrogen cyanide on exposure to the atmosphere.

A number of rats and cockroaches placed in suitable situations were used for the purpose of the test. The conclusions arrived at were:—

(1) That the fumigation, which was unusually prolonged, proved satisfactory from a deratisation point of view—all the rats being killed.

(2) The operation was so arranged that the fumigators were not required to pass through any space full of gas; this is of advantage owing to the lethal power of the gas.

(3) The bottles were inverted according to instructions and emptied themselves rapidly, the gas being given off immediately.

(4) The containers, into which the liquid is poured, are useful to prevent any staining of linoleum or carpets.

Suggestions :—

(1) That men specially trained in the use of gas masks and who know the dangers of the gas should only be employed.

(2) That a higher concentration than that used for the test is required for effective disinfestation (i.e., the destruction of cockroaches).

(3) That each bottle should be provided with a label stating the amount of available H.C.N. which it contains.

(2) SALFURKOSE (a sulphur compound).

This process consists of burning an inflammable liquid in double-jacketed iron containers, the latter being provided with a baffle plate to control the flame.

For the purpose of this test observations were made on a number of rats and cockroaches, which were arranged in such a manner that they could be seen through scuttles during the experiment.

Conclusions :—

(1) This method of fumigation appears to be very satisfactory for the extermination of both rats and other vermin.

(2) The gas is developed rapidly, thus giving the rats only very little time to escape.

(3) The number of containers required is comparatively few, thus saving a certain amount of labour.

(4) The flame from the containers is greater than that usually obtained from burning sulphur, but if the instructions be followed the danger of fire would appear to be practically negligible.

(5) It is necessary that only men specially trained in the use of gas masks should be employed.

(6) This method of fumigation is less dangerous to human life than hydrogen cyanide, but its lethal power is neither so great nor so rapid as that gas.

The following report has been prepared by Dr. E. R. Peirce, assistant port medical officer, on some experiments carried out by the Port Sanitary staff in connection with the determination of the extent of rat prevalence on board ships as shown by the character of the food consumed by them :—

“ A method of determining the prevalence of Rats in Ships.”

DERATISATION.

The problem of determining with accuracy the number of rats in a vessel, or any compartment of a vessel, is one of considerable importance to Port Sanitary Authorities, and has become increasingly so now that shipowners are required to follow the provisions of the International Sanitary Convention of Paris, 1926, with regard to deratisation of vessels.

Article 28 of this Convention requires that all vessels, excepting certain coastwise vessels, shall be furnished with either a Deratisation Certificate or a Deratisation Exemption Certificate, which will remain valid for six months: in the event of the vessel being away from its home port at the end of the six months, a further month's exemption will be granted in order that the certificate may be reviewed on return to the home port. The granting of these certificates is allowed only to certain approved Port Sanitary Authorities which are able to show that they have an adequate and efficient staff for dealing with them, and also the means of either carrying out deratisation themselves, or efficiently supervising deratisation carried out by private firms.

Before granting either a Deratisation or a Deratisation Exemption Certificate it is essential that an accurate estimation of the degree of rat infestation should be obtained, and this is only possible with a staff of men specially trained in the habits of the rat. Until recently the degree of rat infestation of any particular vessel was an elastic term, and no definite standard was laid down. If it were thought that there were more than twenty-five rats in the vessel it was customary to describe it as a “ ratty ship ” : a certain allowance was made according to tonnage, but the whole method was haphazard and no effort was ever made to check the estimation in order to gauge its accuracy.

Before coming to any decision with regard to the degree of rat infestation of a vessel, or compartment of a vessel, the following evidence must be considered :—

- (1) The number of rat runs.
- (2) The number of rat nests.
- (3) The amount of rat harbourage, both temporary and permanent.

- (4) Evidence of damage to cargo, woodwork, &c.
- (5) The presence of excreta, whether it is fresh or stale, the number of droppings, and the diet to which the rats have the most ready access.

It must always be remembered that it is necessary to consider carefully all the evidence obtained before any estimation is given, otherwise a very inaccurate result will be obtained. The question of determining the degree of rat infestation from the number of rat runs, the number of rat nests, the amount of rat harbourage, damage to cargo, woodwork, &c., is a matter which can be attained only by constant practice and training, and depends to a great extent upon the powers of observation of the rat searcher concerned. An efficient rat searcher can distinguish new from old runs, and can decide which way the rats are travelling. In like manner he will be able to distinguish between new and old nests.

The points to be considered with regard to the excreta, however, present more difficulties: it has been assumed in the past that the number of rats likely to be found in a vessel or compartment of a vessel will be directly proportional to the number of droppings found, irrespective of the diet available for the rats; also it has been assumed that the main differences between fresh and stale excreta could be summed up by the fact that fresh excreta are wet and soft and stale excreta dry and hard.

In order to obtain greater accuracy of the degree of rat infestation in ships, a series of observations have been carried out on a number of rats on specified diets in order to determine if possible whether any standard could be laid down with regard to the characteristics of rat excreta, *e.g.*, the number passed in twenty-four hours, the shape, colour, consistency and the differences between fresh and stale. It is not suggested that the degree of rat infestation should ever be judged on the number of droppings alone, but it should always be estimated by the number of droppings in conjunction with the other evidence obtained. It has been found that the average number of droppings passed in 24 hours varies enormously on different diets, so that what may appear at first sight to be a compartment heavily rat infested, may prove eventually to have comparatively few rats and *vice versa*. This

is well illustrated by the number of droppings obtained in 24 hours from rats fed on bran and rice respectively. In the case of bran the average number of droppings per 24 hours is 128, whereas in the case of rice the number is only 21. If therefore it be known what diet the rats can obtain most easily, a much more accurate estimate should be possible.

The distinction between fresh and stale excreta is not so simple as it appears on the surface : all soft and wet excreta are not necessarily fresh, neither are all dry and hard excreta necessarily stale. The fact that the droppings may be mixed with urine, or passed on a wet part of the deck, may keep them moist, and the same result may occur from sweating of the ship, sea water, and the humidity of the atmosphere. In this way excreta which may have been passed several days previously will have all the appearances of fresh excreta. Similarly, excreta found in the warmer parts of a vessel such as the engine room or stokehold, may rapidly become hard and dry, and the same effect will be obtained in hot dry weather if droppings are passed in places fully exposed to the sun : thus excreta may appear to be stale whereas they may be quite freshly passed. A further point to be emphasised is the fact that the excreta vary in appearance according to the diet, and that on certain diets what may appear to be fresh excreta, in that they are wet and soft in consistency, are in fact several days old ; while on other diets the excreta which when first passed, are hard and dry, might easily be mistaken for old droppings.

Another point of interest is the time taken for the formation of moulds on the excreta. On certain diets the excreta become covered with moulds very quickly, in fact in some cases it has been observed as early as 24 hours, whilst on other diets, excreta kept under exactly similar conditions, have shewn no signs of mould for several days. A series of observations have been carried out on a number of rats and the procedure was as follows :—

(1) Four different rats were used.

(2) The diets used were those which rats could obtain most easily in cargo vessels trading to and from Liverpool.

(3) The rats were kept on each diet for ten days. At the conclusion, when each rat had been tested on every diet, a further

four rats were used to check the previous results, so that each of the diets has been tried sixteen times for a period of ten days.

(4) The characteristics of the droppings when fresh, and any change in form and colour after two or three days were noted.

(5) The number of droppings in 24 hours passed by each rat was carefully counted. (It must be remembered that these observations were carried out on rats in captivity and that some variation would be conceivable in rats in their natural state.)

(6) With all diets, water was supplied *ad libitum*.

In order to demonstrate the marked divergencies with regard to both the number and characteristics of the excreta, bran, wheat and rice have been selected as examples. With bran the excreta are very large and cylindrical, $1\frac{1}{2}$ ins. long and $\frac{1}{4}$ in. in diameter. When freshly passed they are smooth, soft and buff-coloured: after 24 hours they exhibit signs of mould. The average number of droppings passed in 24 hours by one rat on this diet is 128.

In comparison with this the excreta obtained from a wheat diet are small, irregular in shape and size, the largest being only about $\frac{1}{2}$ in. long by $\frac{1}{8}$ in. in diameter. Particles of undigested wheat are invariably seen in each dropping, giving it a characteristic knotty appearance, brown in colour, and soft in consistency, but rapidly becoming darker and harder. The average number of droppings passed in 24 hours by one rat is 69.

With rice, the excreta are small, irregular in shape and about $\frac{1}{4}$ in. by $\frac{1}{8}$ in. in size. When freshly passed they are soft in consistency and putty-like in appearance, but they turn black and hard in 24 hours and might easily be taken for old mouse excreta. The average number of droppings from one rat fed on rice is only 21 in 24 hours.

During the time that these observations were being carried out, opportunities were afforded to the rat searchers and rat catchers to study the characteristics of the excreta obtained from the various diets, in order that they might apply this knowledge when attempting to determine the degree of rat infestation of a vessel. The results so far have been very satisfactory and in many cases an accurate forecast has been given, due entirely to the information which has been acquired

by these observations. Unless the diet available for the rats had been taken into account, the estimate would have been hopelessly inaccurate.

It is now the routine procedure in the Port of Liverpool to examine and make estimates of the degree of rat infestation of all vessels as soon as an application is made by the owners for either a Deratisation or a Deratisation Exemption Certificate.

Each vessel is visited by a rat searcher who bases his estimate of the number of rats likely to be discovered after fumigation on the evidence he finds. The time taken over the search is checked carefully in each case by a sanitary inspector. In practice it has been found that the time varies according to the size and type of vessel, the amount of cargo present at the time of the search, and whether the cargo was being worked or not. In order to make a thorough search of a cargo vessel from 4,000 to 5,000 tons by one man, the time required is approximately four hours, and a larger vessel, or one carrying both passengers and cargo, will require from four to six hours.

After all fumigations, an independent rat searcher is sent to search for dead rats, in order to check the estimate made before the fumigation was carried out. The time taken over this search is similarly checked by a sanitary inspector, and in cargo vessels, not carrying passengers, usually takes from two to three hours. In vessels with passenger accommodation a further hour is necessary to make a complete search. It is not an easy matter to make an accurate estimation of the number of rats in a vessel when all sorts and conditions of cargo are carried. It has been observed, however, that certain kinds of cargo are definitely rat-attractive, and the rats will eat such food in preference to any other. In such a case the excreta will have the characteristics of the particular diet which is being eaten, and the estimate can be based accordingly. If the excreta do not shew any marked characteristics and it is not possible to determine what type of food the rats have been taking, a fairly accurate estimate may be obtained by the assumption that the average number of droppings from one rat in 24 hours is from 45 to 50.

Estimation of the number of rats which would be found after fumigation have been made so far in 165 consecutive vessels, and the results shew that a very high degree of accuracy is obtainable. All

types of vessels are included in this list, of which the following are the first 50 consecutive samples :—

Vessel.	Net Tonnage.	Estimated number of Rats.	Number of Rats found after Fumigation.	Time taken BEFORE Fumigation (Hours).	Time taken AFTER Fumigation (Hours).
No.					
1	4,066	Nil	Nil	4	4
2	3,629	Nil	1	4	4
3	5,024	over 200	301	—	5½
4	4,104	5	Nil	4	4¾
5	4,021	1 or 2	Nil	4	4
6	4,178	12	18	3¾	4]
7	7,693	20	14	5	5
8	4,069	Nil	Nil	4	4
9	4,221	Nil	3	6	4
10	530	3	Nil	2	2
11	6,812	50	44	6	6
12	3,149	20	10	4	4
13	3,828	2	Nil	4	4
14	3,587	Ratty ship.	246	—	6
15	4,527	10	8	4	4
16	4,058	Nil	Nil	4	3
17	5,810	6	16	5	4
18	6,883	3	Nil	4	4
19	4,995	6	3	5	4
20	4,190	Nil	Nil	6	4
21	5,380	6	Nil	4	4
22	970	12	7	2	2
23	3,402	2	3	4	3
24	6,791	6	Nil	5	4
25	3,210	60 to 70	54	4	4
26	4,101	10	30 Mice	4	4
27	3,806	3	1 Mouse	4	3½
28	8,603	12	7	6	5
29	6,576	15	Nil	4	4
30	4,813	Nil	Nil	4	3
31	2,929	2	1	2	2
32	9,614	38 Rats and Mice	25 Rats, 14 Mice	6	6
33	7,179	12 Mice	10 Mice	4	4
34	11,927	Nil	Nil	6	4
35	2,628	4	3	2	2
36	9,645	Nil	Nil	6	6
37	3,600	Nil	Nil	4	3
38	7,252	3	Nil	5	4
39	3,061	4	3	4	4
40	5,241	20	22	6	6
41	3,563	2	Nil	4	4
42	3,664	2	3	4	4
43	11,804	Nil	Nil	6	4
44	9,870	30	25	6	6
45	7,034	8	Nil	5	3
46	10,234	Nil	5 Mice	6	4
47	3,284	Nil	5 Mice	4	3
48	4,594	22	27	4	4
49	4,894	Nil	Nil	5	4
50	4,223	Nil	Nil	4	4

The conclusions to be drawn from the observations made are as follows :—

(1) The average number of droppings per 24 hours was approximately the same for each of the rats when on the same diet.

(2) The size and colour of the droppings varied according to the diet used.

(3) That each diet gave a dropping characteristic in size and colour which could be recognised by a trained man.

(4) That the number of droppings per 24 hours varied according to the diet.

One very useful result has been obtained from these observations and experiments. The staff of rat catchers and rat searchers has had a new interest added to their work and which has helped to prevent it from becoming monotonous. The results of the rat estimations are always keenly watched and a healthy rivalry among the men has thus been established. An accurate preliminary estimation of the degree of rat infestation is of great intrinsic value to those concerned in dealing with these problems.

EXTRACT FROM APPENDIX "B."

TABLE OF DIETS ON WHICH RATS WERE FED.

Diet. (1)	Average Number of Droppings passed in 24 hours. 1st Series. (2)	Average used for Estimating Purposes. (3)	Average Size. (4)	Average Number passed in 24 hours. 2nd Series. (5)	General Characteristics, Colour, Shape, etc. (6)
AN	138	128	$1\frac{1}{4}$ to $1\frac{1}{2}$ ins. long, $\frac{1}{4}$ inch diam.	119	Very large, buff coloured, cylindrical rounded ends, smooth, soft. Signs of mould in 24 hours.
CAKE (Cottonseed).	103	106	$\frac{3}{4}$ inch long.	109	Long and thin, brown or chocolate at first but turn black later. Become hard in 24 hours.
EAT	68	69	$\frac{1}{2}$ inch long, $\frac{1}{8}$ inch diam.	71	Small, irregular and show particles of undigested wheat in every dropping. Soft and brown when fresh, but rapidly become darker and harder. Dull in appearance.

Diet.	Average Number of Droppings passed in 24 hours. 1st Series.	Average used for Estimating Purposes.	Average Size.	Average Number passed in 24 hours. 2nd Series.	General Characteristics, Colour, Shape, etc.
(1)	(2)	(3)	(4)	(5)	(6)
GENERAL DIET (Cotton Seed, Wheat, Maize, Locust Beans, Rice Meal, Sharps)	42	56	$\frac{1}{4}$ to $\frac{1}{2}$ inch long, $\frac{3}{8}$ inch diam.	71	Soft and vary in colour from brown to black. Uneven in appearance and show the presence of undigested wheat. Become hard in 24 hours and show signs of mould
LINSEED ...	54	52	$\frac{1}{4}$ inch long, $\frac{1}{8}$ inch diam.	51	Small, hard and irregular when freshly passed. Become either greyish white or whitish in 2 hours.
SUNFLOWER SEED	49	51	$\frac{1}{2}$ to $\frac{3}{4}$ inch long, $\frac{1}{8}$ inch diam.	54	Long, black and shiny. Hard and brittle, even when first passed. Some straight, others curved. After 24 hours become dull and show signs of mould. After 48 hours they become greyish white and very hard and brittle.
WHOLEMEAL (BROWN) FLOUR	49	45	$\frac{1}{2}$ inch long, $\frac{3}{16}$ inch diam.	42	Cylindrical with blunted end. Dark brown and dry when freshly passed. Become almost black in 24 hours, and gradually get harder. Signs of mould after 48 hours.
TAPIOCA FLOUR ...	47	40	$\frac{1}{4}$ inch long, $\frac{1}{8}$ inch diam.	33	Soft and black when fresh. Become hard in 24 hours. Show signs of mould in 48 hours.
WHITE MAIZE ...	28	30	$\frac{7}{16}$ inch long, $\frac{1}{8}$ inch diam.	32	Soft, regular and grey-green when first passed. Signs of mould in 24 hours. Very hard and brittle after 36 to 48 hours. Almost white at the end of a week.
SHELLED PEANUTS	25	30	$\frac{5}{16}$ inch long, $\frac{1}{8}$ inch diam.	35	Very small and soft—similar to mouse excreta. Flat and grey when first, eventually becoming black and shiny. Rapidly become hard
WHITE FLOUR ...	23	25	$\frac{1}{2}$ inch long.	28	Dark green, soft, wet and shiny when freshly passed. After 24 hours become dull, dry and black. Commonly pear shape.
RICE ...	20	21	$\frac{1}{4}$ inch long, $\frac{1}{8}$ inch diam.	23	Small, irregular, soft and putty-like when fresh. Become hard in 24 hours and turn black. Might easily be mistaken for mouse excreta.

Deratisation of premises—the vicinity of docks or quays.

This is carried out by the setting of traps, the laying down of poisoned baits and occasionally by fumigation with hydrogen cyanide.

Rat Proofing.

(1) WHARVES AND WAREHOUSES.—With the exception of a few of the old docks on the central district, the wharves on the dock estate are of rat-proof construction, made with ferro-concrete and stone.

The roadways and pavings of the sheds are setts on a concrete foundation.

The sheds are built of brick and reinforced concrete. All sheds in the new Gladstone Dock are constructed solely of reinforced concrete, and there are no ledges, beams or angle iron on which rats may run.

All offices and wooden huts in the sheds are made rat-proof either by being lifted 18 inches clear of the ground or sheathed with iron or cemented round the base.

New offices or other buildings are either built on brick or concrete piers clear of the ground or the base is built hard and close to the paving of the shed.

Certain new offices in the Gladstone Dock system may be stated to be as near to the ideal as possible, from a rat-proofing point of view. These offices are built solidly of brick, and have a vertical course of expanded metal between the outside and inside courses of brickwork, the whole of the work being bonded by special ties of steel wire.

ACTION TAKEN TO EXTEND RAT-PROOFING ON SHORE.—The Mersey Docks and Harbour Board and the various shipping companies are fully alive to the necessity and benefit of rat-proofing, and practically all sheds, huts, offices and warehouses on the dock estate have now been made rat-proof. Constant supervision is required, however, in the case of stores, otherwise they tend to become harbourages for rats.

It is the duty of the sanitary inspectors to see that all stores are kept clean and tidy, and that no rubbish is allowed to accumulate. Old rope, dunnage, wood, etc., must be stacked neatly on platforms

raised 18 inches from the ground, and the space beneath the platform must be kept clean and free from rubbish.

RAT-PROOFING IN SHIPS.—In the course of their routine examinations of vessels the port sanitary inspectors bring to the notice of the responsible officials any particular part which in their opinion is in need of rat-proofing. In order to make a vessel rat-proof there must be no place where rats may remain undisturbed and make their nests, and also no available food and water supply. It should also be impossible for rats to travel freely from one part of a vessel to another. In order to accomplish this, skeleton casings are adopted for pipes in place of the older type of box casing; expanded metal is fitted round pipes, telephone wires, electric wires, etc., at the point where they pass through bulkheads or from one compartment to another.

INFECTIOUS DISEASE.

The numbers of cases of infectious disease landed from vessels arriving in the Port of Liverpool and those occurring on Liverpool bound ships and which were disposed of prior to the arrival of the vessel at the port, together with the average for the preceding five years are shown in the following table :—

DISEASES	No of Cases. landed from vessels.	Average for the 5 years 1924-1928	No. of Cases dealt with prior to arrival.	Average for the 5 years 1924-1928
Smallpox	1	0·4	17	9·0
Scarlet fever	10	9·4	11	4·8
Enteric Fever	5	11·0	26	24·0
Diphtheria	8	3·0	5	3·8
Measles	8	18·8	54	41·6
Erysipelas	2	2·6	4	3·2
Chickenpox	22	14·0	36	28·4
Yellow Fever	—	0·0	3	1·2
Pulmonary Tuberculosis	49	59·0	30	32·4
Tuberculosis (Other forms)	13	6·4	7	10·8
Pneumonia	13	15·2	46	40·4
Dysentery	1	3·6	16	15·2
Malaria	48	28·4	279	251·6
	180	172	534	466·4

Venereal Diseases.

The purpose of the establishment by the Corporation of venereal disease schemes is to afford facilities for the diagnosis and treatment of these diseases in accordance with the recommendations of the Royal Commission in 1917.

The recommendations may be summarised as follows :—

1. That opportunities should be afforded to sufferers to have free and expert treatment.
2. That extended facilities should be provided for the diagnosis of these diseases.
3. That information as to the dangers of venereal diseases should be disseminated, and particulars given to the public as to the facilities provided for free treatment.

Clinics have been established as under :—

Seamen's Dispensary—Males only.

*Royal Infirmary—Males and Females.

David Lewis Northern Hospital—Males and Females.

*Royal Southern Hospital—Males and Females.

*Stanley Hospital—Males and Females.

Medical Home, Edge Lane—Females.

*Beds are reserved for in-patients at these Institutions.

There were 4,289 new cases, male and female, admitted to the clinics for treatment, and the total attendances of all patients was 110,450.

The following summarises the work of the treatment centres for the year 1929 :—

RETURN SHOWING THE NUMBER OF NEW CASES ATTENDING THE VENEREAL DISEASES CLINICS DURING THE YEAR 1929, ALSO TOTAL ATTENDANCES AND IN-PATIENT DAYS OF OLD AND NEW PATIENTS DURING SAME PERIOD.

	Seamen's Dispensary Males only.	Royal Infirmary. Males and Females.	Royal Southern Hospital. Males and Females.	David Lewis Northern Hospital. Males and Females.	Stanley Hospital. Males and Females.	Edge Lane Medical Home. Females.	TOTAL Males and Females.
New Cases	2,121	1,144	370	272	312	70	4,289
Old and new patients							
Total attendances	51,381	28,082	14,598	9,457	6,932	—	110,450
In-patient Days	—	16	3,056	—	116	8,640	11,858

SEAMEN'S DISPENSARY.

The value of a clinic which is open all day and is devoted entirely to the diagnosis and treatment of venereal diseases has again been demonstrated by the large number of attendances at the above Dispensary (approximately 50 per cent. of the aggregate for all clinics). The following table shews the steady progress which has been made at the clinic since it was opened in 1924 :—

	1925	1926	1927	1928	1929
New patients (including Non-Venereal cases)	1,084	1,360	1,842	2,043	2,121
Old and New patients	1,220	1,855	2,642	2,367	3,023
Attendances	27,265	41,720	49,834	55,217	51,381

The classification of the persons suffering from venereal disease and dealt with at the clinic for the first time during the year, and also for the three previous years, was as under :—

	1925	1926	1927	1928	1929
Syphilis	293	444	459	435	413
Soft Chancre	148	136	157	131	150
Gonorrhœa	636	780	931	1,031	1,112
	1,077	1,360	1,547	1,597	1,675

The attendances per patient suffering from gonorrhœa have been much reduced on account of the installation of electrical treatment apparatus, as a shorter time is required for cure.

Evening clinics are held twice weekly at the Dispensary, and during the year there were 110 new cases and over 2,200 attendances. These patients have satisfied the medical officer that they cannot attend at the usual clinic hours.

This clinic is availed of by patients of all classes of occupation, but the majority are seafaring men.

The medical side of the clinic is run by a whole-time medical officer, who is assisted by several orderlies.

While the average number of attendances per patient has risen slightly, the number of those who cease to attend (before the patient is on the way to recovery or cure has been established) still remains high.

The cause is difficult to analyse, but probably much of it is due to ignorance, indifference, carelessness, or absence of a sense of social responsibility; in a number of cases changes of work, illness, absence at sea or distance, may prevent some from attending the clinic.

Experience has shown that it is the close personal touch with the patient and the interest in his or her case which helps to stimulate the sufferer to continue treatment, but the absence of any feeling of ill-health or discomfort may cause the development of a sense of indifference and the desire to avoid the irksome routine of attendance.

Many patients who are suffering from gonorrhœa unfortunately do not report for treatment until a few weeks have elapsed and the disease has extended considerably from the original point of infection, in many cases having complications, and involving important organs. This neglect or inability to seek medical advice may be attributed to nature of employment or absence on ship at sea, but those who reside locally frequently can and do come for treatment at an earlier stage; the disease, however, is well established in the majority before they present themselves for treatment.

With regard to syphilis, it is found, from figures compiled at the Seamen's Dispensary, that only 25 per cent. of the syphilitic cases attending there appear for treatment in the pre-Wasserman reaction stage, and 24 per cent. appear as early syphilis with primary sore and

positive Wasserman test. Those with syphilis in the secondary stage, with rash, sore throat, &c., form only 8 per cent. of the total. The important point, however, is that fully 40 per cent. of patients are in the stage of later or latent syphilis, including treated cases of more than two years' duration.

An analysis of the various types of the total actual venereal disease met with at the principal clinics is as follows:—

	Percentage of total cases of diagnosed Venereal disease.				
Syphilis	33·5%
Soft chancre	4·5%
Gonorrhœa	62·0%

The figures for Liverpool correspond to those for the country generally.

Most of the patients at the Seamen's Dispensary are drawn from the tramp type of steamer. These men have received inadequate treatment or no medical attention at all. Seamen from North Atlantic liners desiring treatment are few in number, while men from coasting and fishing vessels are sometimes neglectful, and frequently call at uncertain intervals at different clinics, thus preventing treatment of a uniform character and lessening considerably their chance of speedy recovery. The most satisfactory type of patient is the man who has applied for medical aid early, and has been well treated, for example, by the ship's surgeon during a long voyage, e.g., to the Far East. Many of these men give up weeks of employment on shore in their anxiety to be completely cured.

EDUCATIONAL PROPAGANDA.

At the inauguration of the venereal diseases scheme the Ministry of Health approved of certain educational work being conducted to acquaint the general public and those likely to come into contact with venereal disease of the dangers arising therefrom, and after several years' effort in Liverpool, this has culminated in the merging of the various Merseyside boroughs into a scheme for this and general health purposes.

Lectures and addresses have been delivered in the districts mentioned by Dr. Hall, the lecturer-organiser of the Committee; he has addressed the public generally, seamen, workmen at industrial concerns, boys' and girls' and other clubs, scout associations, the clergy and others interested. These have been well attended and appreciated.

	Syphilis.		Soft Chancere.		Gonorrhœa.		Conditions other than Venereal.		TOTAL.	
	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.
1. Number of cases which—										
(a) at the beginning of the year under report were under treatment or observation for	1,258	681	46	...	1,630	518	57	32	2,991	1,231
(b) had been marked off <i>in a previous year</i> as having ceased to attend or as transferred to other Centres, and which returned to the Treatment Centres during the year under report <i>suffering from the same infection</i> ...	95	11	5	...	111	17	...	...	211	28
TOTAL—Items 1 (a) and 1 (b) ...	1,353	692	51	...	1,741	535	57	32	3,202	1,259
2. (a) Number of cases dealt with at the Treatment Centres during the year <i>for the first time</i> with infections of { 1. less than one year's standing	447	159	151	...	1,573	236	863	123	3,034	518
{ 2. more than one year's standing	290	108	17	...	295	27	...	...	602	135
TOTAL—Items 1 (a), 1 (b) and 2 (a) ...	2,090	959	219	...	3,609	798	920	155	6,838	1,912
2. (b) Number of cases included in Item 2 (a) known to have received <i>previous treatment at other Centres</i> for the same infection	117	43	4	...	198	25	...	...	319	68
3. Number of cases which ceased to attend—										
(a) before completing the first course of treatment for... ..	245	75	56	...	1,060	115	...	...	1,361	190
(b) after one or more courses but before completion of treatment for ...	369	113	...	...	...	...	...	...	369	113
(c) after completion of treatment, but before final tests as to cure of ...	82	24	5	...	309	58	...	...	396	82

	Syphilis.		Soft Chancre.		Gonorrhœa.		Conditions other than Venereal.		TOTAL.	
	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.
4. Number of cases transferred to other Treatment Centres after treatment for ...	129	10	25	...	165	27	...	...	319	37
5. Number of cases discharged after completion of treatment and observation for ...	43	36	88	...	499	67	...	...	630	103
6. Number of cases which, at the end of the year under report, were under treatment or observation for ...	1,222	701	45	...	1,576	531	39	18	2,882	1,250
TOTAL—Items 3, 4, 5 and 6	2,090	959	219	...	3,609	798	39	18	5,957	1,775
7. Out-patient attendances—										
(a) For individual attention by the Medical Officer ...	14,859	7,036	784	...	28,031	4,161	2,234	329	45,908	11,526
(b) For intermediate treatment, e.g., irrigation, dressings, etc. ...	1,035	77	1,048	...	48,762	1,898	196	...	51,041	1,975
TOTAL ATTENDANCES ...	15,894	7,113	1,832	...	76,793	6,059	2,430	329	96,949	13,501
8. Aggregate number of “In-patient days” of treatment given to persons who were suffering from ...	365	2,649	4	...	541	8,149	60	90	970	10,888
For detection of										For Wassermann Reaction.
Spirochetes.				Gonococci.		Other Organisms.				
(a) Specimens which were examined at, and by the Medical Officer of, the Treatment Centres ...				3,274		...		...
(b) Specimens from persons attending at the Treatment Centres which were sent for examination to an approved laboratory ...				2,450		...		4,663		

9. Examinations of Pathological material:—
 (a) Specimens which were examined at, and by the Medical Officer of, the Treatment Centres ...
 (b) Specimens from persons attending at the Treatment Centres which were sent for examination to an approved laboratory ...

The Hygiene of Crews' Spaces.

During the year careful attention has been paid to the inspection of crews' spaces by the port sanitary inspectors. All vessels entering the port are visited as soon as possible after docking, and enquiries are made concerning the health of the crew, the occurrence of any sickness during the voyage, the source of the water supply, the condition of all tanks and bilges, the condition of storerooms, and whether any sick or dead rats have been found.

After making these enquiries the sanitary inspector, accompanied by a ship's officer, visits the crew's quarters, and their condition is noted, particular attention being paid to cleanliness, structural defects, rat-harbourages, accumulations of rubbish, etc. The attention of the officer is called to any defects that are found, and a request made that they should be remedied. These instructions are carried out by the shipping company concerned without any difficulty. The inspector re-visits the vessel from time to time, and notes when the defects have been made good.

There has been no outstanding feature in regard to construction during the past year. There is a general tendency to improvement in the matter of cleanliness, and although crews' quarters are still left dirty when the men pay off, they do not appear to be as dirty as was formerly the case. In quite a number of cases the crews' quarters are "rough cleaned" soon after arrival, the final cleansing being carried out after the workmen have left the vessel, which is usually about two days before the vessel sails. Defects such as leaky decks, defective scuttles, etc., are due to stress of weather and are always remedied while the vessel is in port.

VERMIN IN CREWS' QUARTERS.—It is the practice of many shipping companies to fumigate the crews' quarters every voyage, and in addition to spray with an insecticide; a supply of the latter is also available for use during the voyage; in such vessels there is a marked improvement in the condition of the crews' quarters.

RAT-PROOFING.—There is a steady increase in the number of vessels which are being made rat-proof. Unnecessary linings are being removed, and skeleton casings substituted for the old box casings; expanded metal is being used more extensively to protect openings which are necessary for light, ventilation, and the passage of pipes, etc.

INSPECTION OF SHIPPING.

Year 1929.

Nationality.		Visits.	Re-visits.	Total.
British ...	...	3,376	2,649	6,025
Norwegian	...	125	26	151
Swedish...	...	72	12	84
Spanish...	...	75	34	109
Danish ...	...	100	14	114
Japanese	...	28	24	52
Italian ...	...	15	12	27
Portuguese	...	6	1	7
Russian ...	...	14	4	18
French ...	...	23	9	32
Brazilian	...	7	3	10
Dutch ...	...	57	20	77
Greek ...	...	45	49	94
American	...	141	51	192
Belgian	...	2	2	4
German ...	...	52	7	59
Esthonian	...	1	—	1
Finnish ...	...	13	1	14
Jugo Slav	...	8	7	15
Roumania	...	2	1	3
Peruvian	...	1	6	7
Mexican ...	...	1	—	1
Lettish ...	...	1	—	1
Total ...		4,165	2,932	7,097

THE FOLLOWING TABLE SHOWS THE NUMBER AND NATIONALITIES OF THE VESSELS ON WHICH DEFECTS
WERE DETECTED DURING THE YEAR 1929.

NATIONALITY	Number of Ships	Dirty Forecasts	Dirty Wash houses, Store-houses, etc.	Foul Water Casks	Foul Bilges	Foul W.C.'s	Accumulations of offensive refuse	Gear stored in Crew's Quarters	Damp Quarters	Water lodging on top of Forepeak Tank	Animals kept, causing nuisance	Leaky Decks overhead	Defective Stoves	Defective Bulkheads	Defective Ports and Sky-lights	Defective Ventilators	Defective Flooring Boards	Defective Hatches and Lockers	Defective Chain Pipes	Defective Hose Pipes	Defective W.C. Fittings	Defective Soil Pipes	Inadequate Ventilation	Inadequate Lighting	Inadequate Drainage	Bare Iron not Sheathed	W.C.'s deficient in Ventilation and situation bad	Total number of Defects	Total Remedied
British ...	724	2670	20	...	...	277	7	...	8	4	2	40	27	...	157	5	1	4	8	2	16	5	6	4	2	...	...	3265	3207
Norwegian ...	1	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	1
Spanish ...	1	4	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	4	4
Danish ...	1	...	...	...	...	...	...	...	...	...	...	1	...	...	2	...	...	...	...	...	...	...	...	...	...	...	...	3	3
Greek ...	6	18	...	...	...	...	...	...	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	19	19
American ...	1	.	...	...	...	2	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	2	2
Total ...	734	2692	20	...	...	280	7	...	8	4	2	41	28	...	159	5	1	4	8	2	16	5	6	4	2	...	...	3294	3236

Summary of Insanitary Conditions during the year 1929.

Class of Vessels.	Number Inspected.	Number on which Nuisances were found.	Per cent.
SAILING FOREIGN—			
Steamers	3,652	709	19.42
Sailing	—	—	—
Total... ..	3,652	709	19.42
SAILING COASTWISE—			
Steamers	503	25	4.97
Sailing	10	—	—
Total... ..	513	25	4.87

Nationality.	Number Inspected.	Number on which Nuisances were found.
British	3,376	724
Foreign	789	10
	4,165	734

Nuisances arising through

Defects of Original Construction. (a)	Per cent. of Total Defects.	Structural Defects through wear and tear. (b)	Per cent. of Total Defects.	Dirt, and other conditions prejudicial to health. (c)	Per cent. of Total Defects
12	0.36	269	8.16	3,013	91.47

Canal Boats.

The port sanitary inspectors have been appointed inspectors under the Canal Boats Acts, 1877 and 1884. An inspector devotes one day each week to the inspection of canal boats plying in the river or docks, and during the year 633 boats were inspected, of which 26 were found to have some condition contravening the regulations.

Medical Inspection of Aliens.

The following table gives the total number of aliens arriving in the Port of Liverpool during 1929, and the number in each of the categories under which alien passengers are classified by the Immigration Department of the Home Office :—

Medical Examination of Aliens.

Total aliens	Transmigrants	Residents returning	In transit
20,619	3,477	267	2,373
Visitors of 6 months or less		Diplomats & persons on Foreign Govt. Missions.	Seamen
On holiday, tourists, &c.	On Business		
12,667	472	86	241
Seamen under Contract to join ships in British Waters.		Ministry of Labour Permits	Other Aliens
299		52	685

The medical inspection and examination of aliens is carried out by the assistant port medical officers. The objects of the inspection are to ascertain whether any of the alien passengers are :—

- (1) Suffering from any disease likely to be a danger to the public health of this country.

(2) Suffering from any disease or deformity likely to cause such aliens or their dependents to become a public charge.

No alien is allowed to take up employment in this country without a special permit from the Ministry of Labour, so that it is rare for the medical inspector to have to consider the earning capacity of an alien. The procedure with regard to the medical inspection and examination of aliens entering the Port of Liverpool is as follows:—

The medical officer boards the vessel immediately on arrival with the view of obtaining information as to the health of all persons on board from the ship's surgeon, and also of making a rapid preliminary inspection of all classes of immigrants. This latter may be completed before the immigration officers start their examination, or may occur simultaneously with it, depending upon the circumstances. Note is made of any alien who in the opinion of the medical officer should require a more detailed examination, irrespective of the time that the alien may wish to remain in the country.

The medical officer attends during the examination made by the immigration officers, when a further opportunity is afforded to inspect the aliens more closely. All aliens who wish to stay in this country more than three months are referred to the medical inspector for examination.

During 1929 medical certificates were issued in respect of ten aliens, two for mental deficiency and eight for venereal disease.

Transmigrants.

Elaborate precautions are taken by the United States Public Health Service to prevent the occurrence of typhus fever among emigrants from Central Europe to America. Special stations have been erected, through one or other of which all transmigrants must pass. Here they are medically inspected, freed from vermin, and all their clothing disinfected.

All second and third-class passengers bound for the United States, whether from the Continent or British Isles, are inspected by an officer of the U.S. Public Health Service immediately before sailing, and if

any are found to be in a verminous condition they are sent to the city disinfecting station, where suitable accommodation is available for the destruction of vermin in the clothing and belongings of each person. The cost of the disinfection is defrayed by the shipping company concerned.

The number of transmigrants dealt with under this arrangement was 115 during the year 1929.

Emigration.

The number of emigrants leaving the Port of Liverpool during the year 1929 was 113,116 a decrease compared with the previous year, when the number of emigrants leaving the port was 116,083. The following is a return of the number of emigrants and clearances of ships, including those passenger vessels in which medical inspection was not required from 1913-1929 :—

In 1914, 232,954 Emigrants, and 1,065 Clearances of Ships.

„ 1915,	75,387	„	677	„
„ 1916,	58,749	„	562	„
„ 1917,	18,908	„	379	„
„ 1918,	13,588	„	287	„
„ 1919,	120,187	„	673	„
„ 1920,	204,868	„	769	„
„ 1921,	161,132	„	714	„
„ 1922,	120,691	„	804	„
„ 1923,	159,874	„	850	„
„ 1924,	122,201	„	869	„
„ 1925,	111,918	„	894	„
„ 1926,	116,672	„	850	„
„ 1927,	123,801	„	892	„
„ 1928,	116,083	„	888	„
„ 1929,	113,116	„	908	„

The following Tables, relating to Immigration have been kindly supplied by the Board of Trade.

Statement showing the number of passengers (emigrants and others), distinguishing British subjects and aliens, who left the port of Liverpool for places out of Europe in the year 1929 :—

DESTINATION.	British Subjects.	Aliens.	Total.
British North America ...	43,907	11,786	55,693
Australia and New Zealand	3,302	34	3,336
British South Africa ...	2,134	37	2,171
India (including Ceylon)...	5,777	139	5,916
Other parts of the British Empire ...	8,194	300	8,494
Total British Empire ...	63,314	12,296	75,610
United States	14,828	14,919	29,747
Foreign South America ...	2,705	618	3,323
Other Foreign Countries	4,281	155	4,436
Total Foreign Countries...	21,814	15,692	37,506
Grand Total ...	85,128	27,988	113,116

Number of passengers (emigrants and others), distinguishing British subjects and aliens, as given on page 51, who left the port of Liverpool in each month of the year 1929 :—

MONTH.				British Subjects.	Aliens.	Total.
January	...	...	...	4,464	831	5,295
February	...	...	...	3,764	1,018	4,782
March	...	...	...	7,413	1,867	9,280
April	...	...	...	7,981	1,711	9,692
May	...	...	...	9,340	1,735	11,075
June	...	...	...	6,575	1,983	8,558
July	...	...	...	7,662	3,009	10,671
August	...	...	..	10,531	6,749	17,280
September	...	...	...	10,422	4,283	14,705
October	...	...	...	8,587	2,221	10,808
November	...	...	...	5,835	1,597	7,432
December	...	...	...	2,554	984	3,538
Total				85,128	27,988	113,116

Emigrant Inspections.

All emigrants travelling second or third-class on board vessels outward bound are subject to inspection by the medical officers of the Board of Trade. The crews of all such vessels bound for America are also subjected to inspection by these officers. An inspector of the Port Sanitary Authority attends these clearances in order to supervise the removal of any persons who may be rejected on account of actual or suspected infectious disease.

During the year 1929 there were 215 inspections, and 11 persons were rejected on account of infectious disease.

Date 1929.	Name of Vessel.	Nature of Sickness.	Where taken to	Description of Patient.
Jan. 4	Montroyal ...	Measles ...	Grafton Street Hospital	Child
,, 18	Minnedosa ...	Chicken Pox ...	Fazakerley Hospital ...	Child
Feb. 22	Montclare ...	Chicken Pox ...	,, ,,	Children (2)
Mar. 28	Duchess of Bedford	Measles ...	,, ,,	Child
April 6	Scythia ...	Chicken Pox ...	,, ,,	Child
June 7	Montroyal ...	German Measles ...	,, ,,	Child
,, 21	Laurentie ...	Bronchitis ...	Boarding House ...	Infant
July 6	Duchess of York	Measles ...	Fazakerley Hospital ...	Child
,, 12	Duchess of Atholl	Scabies ...	Boarding House ...	Adult
,, 19	Andania ...	Chicken Pox ...	Fazakerley Hospital ...	Child
Aug. 30	Antonia ...	German Measles ...	,, ,,	Child
Sept. 7	Baltic ...	Scabies ...	Returned home ...	Adult
Oct. 18	Doric ...	Measles ...	Grafton Street Hospital	Child

Supervision of Foodstuffs.

The inspection and control of imported foodstuffs has been carefully attended to throughout the year. This work is carried out by a staff of seven qualified food inspectors, each inspector covering a certain

area, and being responsible for all foodstuffs landed in that area. The procedure adopted in the first instance is one of sampling, and the percentage examined varies according to the circumstances of landing, and the type and condition of the foodstuff. Whenever possible a 10 per cent. examination is aimed at. With canned goods the procedure is slightly different. If 3 per cent. be found to be unsound, the inspector calls on the importer to undertake a 10 per cent. examination under his supervision. If at this examination 3 per cent. should be found to be unsound, then the whole of the consignment must be examined. Information with regard to imported foodstuffs is obtained daily from the following sources :—

- (1) The Customs Bill of Entry, which is a daily journal giving a list of all foodstuffs entering the Port.
- (2) The ship's manifest.
- (3) Letters from importers.
- (4) Customs forms showing goods detained by them.

A special log is prepared each day from the above for the use of each inspector. A certain percentage of each consignment landed is inspected on the quay-side, and if none is found to be unsound the whole consignment is released at once. If, however, any part of the consignment be found to be diseased, part diseased, or unsound, and that the whole consignment is too large to be dealt with on the quay-side, arrangements are made with the importer for it to be transferred to suitable premises. In the case of frozen meats the consignment is transferred to a local cold store and subsequently dealt with there.

Canned goods, dried box goods, oranges, apples, etc., are usually transferred to a local warehouse. In either case the sound goods are removed from the unsound and the former released for sale. Unsaleable foodstuffs are allowed to go for industrial purposes, but great care is always taken that these foods are not marketed for human consumption, and only well-known and reliable firms, approved of by the medical officer of health, are allowed to receive them for the purpose of manufacturing animal foods, dog biscuits, melting down for fat extraction, etc.

Each of these firms must give a written guarantee (see below) that the unwholesome food received by them will only be used for industrial

purposes, and wherever possible it is the duty of the inspector to satisfy himself that this guarantee is being faithfully fulfilled. In the event of the importer disagreeing with the inspector as to the character of any goods, the latter makes application to a magistrate, who, if he is satisfied, gives an order for the destruction of the goods under the supervision of the medical officer of health. In practice it is rare for a magistrate's order to be necessary, this being the result of the common sense and sound judgment of the inspectors concerned.

GUARANTEE IN RESPECT OF UNSOUND AND UNWHOLESOME FOOD.

I, the undersigned, being the purchaser of*.....

* Quantity and Weight to be stated.

.....
from Messrs.....in consideration
of the same being released to me, guarantee that no
portion of the same shall be used for human food in any
form, but the whole of the said.....
shall be removed to my premises at (*full address*).....
.....
and there be used for the purpose of.....

I also guarantee that no portion of the said.....
shall be disposed of to any other person for any purpose
whatsoever.

Signed

Address.....

Witness

Address.....

*To the Medical Officer of Health,
Public Health Department,
Dale Street, Liverpool.*

The following item in regard to imported foods is of interest:—

A large quantity (6,088 tins) of frozen egg pulp was damaged and had become mouldy and sour, and was allowed to be exported for use in leather dressing, etc., under proper guarantees.

The Regulations issued in regard to preservatives in foods have been well carried out during the year; large quantities of boraxed bacon and ham were imported from the U.S.A. and Canada. At first the largest quantity was re-exported to the Irish Free State, but since importation into Ireland has been prohibited, the quantities arriving have been much reduced. The bulk of the imports are, however, under bond, and are either exported or utilised as ships' stores, in accordance with the Regulations.

During the year large consignments of sheep carcasses from South America and Australia have been found to be affected with epizootic lymphadenitis. The condition has been known to the Authority's officers for a long time, and carcasses found to be seriously affected were dealt with, but it is only recently that the affection has become more widespread in the sheep in these countries.

There is no evidence that the disease is communicable to man.

Epizootic lymphadenitis occurs most frequently amongst sheep, seldom in lambs. The disease appears as dry caseated areas, chiefly in the superficial skeletal lymphatic glands, e.g., the prescapular, precrural, inguinal or popliteal; it may also be evident in the viscera or muscular system.

The routine inspection of the freshly killed carcass should be carried out by feeling for the enlarged glands or nodules.

The recommendations of the Ministry of Health in regard to this condition are set out under Memorandum on Meat Inspection (Memo. 62: Foods). These recommendations state that the entire carcass and all the organs shall be condemned if there is any evidence of caseous lymphadenitis.

Strenuous action was taken from November, 1928, to deal with the condition with the object of tightening up the inspection work in the countries of origin, this being the natural place for the elimination of such carcasses, and before the mutton is placed in cold store or on board ship.

The position at the time of this report is that a great reduction has taken place in the percentage of affected mutton.

Evidences of careful inspection are now forthcoming in the case of most firms' imports, the glands affected being cut and exposed for inspection. With regard to one or two firms, improvement is still desirable.

IRISH DRESSED MEAT.

In December, 1927, meat dressed in Waterford began to be sent regularly to Liverpool. No organs were sent, and inspection had not been carried out.

On December 20th, 1927, two sides of cow-beef from Waterford were seized and legal proceedings against the consignor were considered by the Medical Officer of Health and the Town Clerk.

In January, 1928, a further consignment was seized from the same source.

Subsequently correspondence took place with the Irish Free State Authorities, and resulted in the statement "that the position is that it is not practicable to institute a prosecution in the Irish Free State in respect of the alleged offence, as a condition precedent to a prosecution is that meat alleged to be unsound should first be condemned by a Peace Commissioner." It was therefore unlikely that the person who despatched the unsound meat from Waterford could legally be made amenable in Liverpool.

During 1929 the following meat has been seized,* mainly due to tuberculosis, other causes being dirt or injury :—

77 sides.

1 boneless side.

16 quarters.

3 buttocks.

Most of the meat came from Waterford, a few lots from Cork, and one lot from Drogheda.

NOTE.—* The meats in question, although arriving within the area of the Port Sanitary Authority, are allowed to pass on to the City Markets to which they are destined for sale. Due notice of the character of the consignment and other particulars are telephoned through to the meat inspectors staff in the city. A full inspection of the meat is made by the city food inspectors on arrival at the meat markets.

A certain amount of inspection is now carried out by the Irish Authorities.

Attention has been given to dirty meats under the Public Health (Meat) Regulations, 1924, and the quantities rejected have been greater than in previous years.

The s.s. "Celtic," wrecked off the S. Irish coast, had large quantities of various foodstuffs on board. These were landed at Liverpool by coasting steamers, and whilst a very large quantity was salvaged, there were certain consignments which required to be destroyed or were dealt with under the medical officer of health's supervision before being released. The latest portions of the cargo to be dealt with included 19,050 hams and 8,715 pieces of bacon, which were decomposed and were melted down for grease.

On the s.s. "Oregon Star," from Buenos Ayres, there were 32,347 sheep and lambs, fire and smoke damaged; they were of Chilian and Patagonian origin, and it was stated that they had been transferred from the s.s. "Magic Star," which had been on fire near South America.

A large proportion of the above was melted into tallow, but the whole consignment was carefully inspected before any carcasses were released.

There were landed ex the s.s. "Oklahoma" from the West Coast of South America, 130 tons of sugar damaged by fire and water. There were also 51 tons of sugar from the s.s. "Valprato," from Cuba, in the same condition. The sugar was sent to a refinery, where it was purified, and the residue utilised for animal food.

Colonial and foreign fruits have arrived in very large quantities, many new sources of supply having been opened up. Liverpool still receives the largest supplies of green fruit from all parts of the world, as fruit production is extending, and shippers are seeking additional markets.

The general sanitary conditions under which fruits are shipped show a vast improvement, being wrapped in glazed papers and standardised

packings, and carried in special (cool chambered) steamers. More care is now being taken in landing fruit, and some of the new dock sheds have special reserved and lime-washed spaces where the fruit cargo is landed.

New imports during the year have included many varieties of fresh plums and peaches, Chilian fruits, such as oranges, apples, grapes and pears, Brazilian oranges, bananas and grapes, West African bananas, Californian grape fruit and pears, and vast quantities of new potatoes from Spain and Egypt.

Apples from Australia have been free from "brown heart," a condition referred to in previous Annual Reports.

Jaffa and Valencia oranges have arrived in large quantities, and in good condition, mouldy or wasty oranges are removed on the quayside and destroyed. The packing condition of Valencia oranges has much improved.

Fruit pulp from the Continent has arrived in better condition than in previous years, but a close inspection is made and care has been taken to see that the casks are cleansed at the various factories in the city before they are returned for further fillings of fruit.

American apples from Virginia form one of our chief supplies of this fruit, which arrives in large shipments, as a rule in good condition.

The public health authorities in this country have for some time had under consideration the subject of the sanitary conditions under which Greek currants are prepared, packed and shipped, and the medical officer has obtained information from responsible officers at Patras which will be of general interest. This information appeared in last year's report, but a repetition is thought desirable.

It may be stated that currants are the dried, stoneless grapes of a vine which grows abundantly in the Greek Islands; they are small, thin-skinned, sweet, and blue in colour, growing in dense clusters. A good deal of labour is expended in their cultivation; grafting,

pruning, irrigation, etc., are indispensable. During the ripening, the tender fruit has to be sprayed with sulphur solution to protect from "Oidium" fungus or mildew. When the grapes are cut, in August-September, the bunches are laid down on the drying grounds near the vineyards. Special regulations provide that the fruit should be laid down on trays or on paper spread on the drying floor surface. The drying process takes about 8-10 days, when the fruit is raked up and put through a winnowing machine which blows out any loose stalks and dust. The better qualities are "shade dried" under roofing, they are not exposed to the rays of the sun. The fruit is then bagged and sent to market, where it is sold to dealers.

The exporters at Aigion (Vostizza), the centre of the shade-dried fruit district, Patras, Pyros (for Katakolon shipments), and Kalamata, receive the fruit in bags by rail, or occasionally in bulk by sailing vessels. It is weighed upon reception and placed into stores, being emptied on the cement or tiled floors. When packing takes place the fruit is firstly winnowed to free from stalks and foreign matter, and may again be passed through machinery to free from small stem stalks if so required by the purchaser. The fruit is then sifted through sieves according to grading required, weighed and packed, generally quarter-cases, by machinery. The trampling of the fruit into the boxes by foot, formerly in universal use, has now been abolished. There is no "washing" of the fruit at any time before or during the packing, excepting that salt water is used to free the fruit clogging the wires of the machine. A small quantity of salt water may occasionally be thrown over the fruit when in the stores, as this preserves the quality and colour.

The Greek Ministry of Health use every precaution to safeguard the cleanliness of the fruit, such as the regular inspection of warehouse floors, compulsory use of grading, cleaning and pressing machines.

Regulations now require the country of origin of fruit to be stamped on the containers or packages.

Samples of fruits, e.g., apples, pears, oranges, etc., are regularly examined for the presence of chemical preservatives.

All Brazilian nuts are cleaned, picked and sorted on the quay, any mouldy samples are destroyed. During the year a large consignment of peanuts arrived *via* Rotterdam; it was found to be unsound, being swarming with grubs. The consignment was utilised for industrial purposes.

With reference to the method of procedure adopted by various shipping companies in the Port of Liverpool in regard to the carrying, landing and disposal of hides and animal products in relation to foodstuffs, this matter has always received the careful consideration of our inspectors, but certain enquiries were made to ascertain whether the suggestions made to all concerned some years ago with regard to the danger of the contamination of foodstuffs with anthrax spores were being carried out, and to further remind them of their importance the following questions were submitted:—

1. What precautions are taken on board ship to prevent foodstuffs from being contaminated by hides, etc.?
2. How are the hold sweepings from these products disposed of?
3. What precautions are taken on the quayside?
4. How are the dock sweepings disposed of?

From a perusal of the replies from the eleven importing firms the following is a summary, and these have been confirmed by the Port Sanitary staff:—

1. Instructions have been issued to all ships' officers to the effect that hides must not be stowed in close proximity to any foodstuffs.
2. The hold sweepings of the ship are put ashore in the majority of cases and mixed with the shed sweepings, being subsequently removed to the destructor.
3. Instructions have also been issued to quay foremen or master porters that where hides are landed every possible care is taken to see that they are stowed separately, so as to prevent contamination of foodstuffs.

A large amount of correspondence has been occasioned by the work of the Department on such subjects as the importation of meat, preservatives in food, etc., or the presence of boric acid in foodstuffs. The Medical Officer of Health and the Deputy Medical Officer of Health have had many interviews with representatives in regard to the Food Regulations in force under the Ministry of Health.

The following table gives the particulars of samples of foodstuffs, etc., sent to the City Analyst and Bacteriologist for examination during the year 1929 :—

CITY ANALYST.					CITY BACTERIOLOGIST.				
Canned Peas	...	...	...	1	Canned Beef	...	...	...	2
Milk	...	...	...	1	„ Carrots	...	...	...	1
Black Currant Pulp	...	...	...	1	„ Gravy Soup	...	...	...	1
Strawberry Pulp	...	...	...	1	„ Pea Soup	...	...	...	1
Bacon	...	...	...	3	Wool	...	...	...	40
Ham	...	...	...	2	Water	...	...	...	5
Sugar	...	...	...	2					
Borax	...	...	...	1					
Wheat	...	...	...	1					
				<hr/> 13 <hr/>					<hr/> 50 <hr/>

Five samples of tinned foodstuffs were examined, and none call for any special comment. Four specimens of blood, and two specimens of faeces were examined for typhoid infection, and two specimens of blood for typhus infection, and all were negative. Five samples of ships' water were examined.

During the year 40 samples of treated and untreated wool, hair, etc., were examined for the Government Wool Disinfecting Station for the presence of anthrax bacilli, and proved negative. All the treated samples were sterile.

There were 4,679 rats examined from ships, quays, etc., and no evidence of the bacillus of plague was found in any of them.

TABLE SHOWING THE NUMBERS OF CATTLE, SHEEP, AND SWINE EXPORTED FROM IRELAND TO LIVERPOOL DURING THE YEAR 1929, AND SHOWING THE PORTS IN IRELAND AT WHICH THE ANIMALS WERE SHIPPED.

	Cattle.	Sheep.	Swine.
Ballina	350	12,051	3,635
Belfast	652	2,218	72
Cork	30,316	7,166	23,568
Drogheda	23,793	26,683	56
Dublin	135,790	172,522	6,619
Dundalk	10,560	34,957	304
Galway	363	5,989	824
Londonderry	4,177	16,441	609
Limerick	3,204	74	49
Newry	251	538	29
Sligo	272	13,473	11,819
Waterford... ..	26,484	26,208	1,628
Wexford	2,122	5,816	18
Total	238,334	324,136	49,230

TABLE SHOWING THE TOTAL NUMBERS OF THE SEVERAL KINDS OF CATTLE, SHEEP AND PIGS EXPORTED FROM IRELAND TO LIVERPOOL DURING THE YEAR 1929.

CATTLE.	No.	SHEEP.	No.
Fat	175,535	Fat	109,374
Stores (for fattening)	47,267	Stores	59
Milch Cows	7,986	Lambs	214,703
Springers	685		
Calves	6,861	Total Sheep ...	<u>324,136</u>
Total Cattle ...	<u>238,334</u>	PIGS.	
		Fat	49,106
		Stores	124
		Total Swine ...	<u>49,230</u>

STATEMENT SHOWING THE NUMBER OF LIVE CATTLE, &c.,
LANDED AND SLAUGHTERED AT THE FOREIGN ANIMALS
WHARF (BIRKENHEAD, ALFRED AND WALLASEY
LAIRAGES) DURING THE YEARS 1921 TO 1929 INCLUSIVE.

Year.	LANDED.				SLAUGHTERED.			
	Oxen.	Calves.	Pigs.	Sheep, Lambs and Goats.	Oxen.	Calves.	Pigs.	Sheep, Lambs and Goats.
1921	195,785 49,434	— —	19,224 —	325,982 6,706	63,178 49,224	— —	2,766 —	165,968 6,706
1922	262,601 38,648	8 1	31,257 —	418,604 —	63,002 38,648	1 1	515 —	153,381 —
1923	166,994 39,690	7 —	77,536 —	194,296 7,003	50,432 37,482	— —	4,886 —	90,736 7,003
1924	217,176 417 52,193	— — —	58,690 888 —	358,310 4,568 4,252	54,572 37 42,324	— — —	4,985 3 —	134,207 627 4,252
1925	159,638 218 43,673	— — —	16,745 366 —	— 253,617 3,919	41,332 32 35,567	— — —	883 2 —	10,608 349 —
1926	165,187 208 38,870	— — —	35,785 171 490	312,745 4,052 —	45,876 16 28,997	— — —	1,681 — 490	150,378 606 —
1927	199,172 351 4,074	— — —	61,713 413 —	379,736 4,635 —	62,323 43 3,712	— — —	1,657 — —	164,985 332 —
1928	249,008 280 444	— — —	47,224 362 —	365,820 2,630 —	73,245 33 170	— — —	2,256 3 —	144,441 561 —
1929	238,185 266 693	— — —	48,882 416 —	325,224 2,789 —	67,423 62 693	— — —	1,103 2 —	122,929 714 —

Heavy type represents Irish.

† Isle of Man.

‡ Foreign.

TABLE SHOWING THE VALUES OF THE IMPORTS OF MEATS (EXCEPT POULTRY AND GAME) INTO THE PORT OF LIVERPOOL DURING THE YEARS 1920 to 1928.

Description.	Years.								
	1920.	1921.	1922.	1923.	1924.	1925.	1926.	1927.	1928.
Bacon	£ 21,746,024	£ 13,472,791	£ 8,819,177	£ 8,506,723	£ 7,080,117	£ 8,612,930	£ 7,415,016	£ 4,103,753	£ 3,592,574
Beef, fresh and refrigerated ...	17,754,543	13,430,866	8,016,721	8,561,258	7,771,561	9,992,622	10,333,855	7,223,519	8,345,604
Beef, salted... ..	—	—	—	—	—	—	—	—	—
Hams	109,461	4,225,544	5,148,303	5,043,264	4,547,822	5,183,481	4,389,201	2,549,153	2,541,186
Mutton, fresh and refrigerated ...	5,702,678	5,842,010	4,262,439	4,879,930	3,337,957	4,314,957	3,498,206	3,503,587	4,140,843
Pork, fresh and refrigerated } Pork, salted	1,639,590	920,772	419,018	948,484	555,610	623,824	538,273	345,024	406,868
Rabbits	342,821	95,873	65,563	77,096	33,092	44,393	67,275	34,322	35,945
Unenumerated, fresh, refrigerated and salted	973,877	678,012	} 581,442	419,381	} 403,506	550,386	492,290	474,294	418,762
Preserved, otherwise than by salting	2,638,774	1,253,263		1,541,595					
Totals	£50,907,768	£39,919,131	£27,312,663	£29,977,731	£23,729,665	£29,322,593	£26,734,116	£19,415,567	£20,722,273

TABLE SHOWING THE QUANTITY OF UNSOUND MEATS
UTILISED UNDER SUPERVISION
DURING THE YEARS 1924 TO 1929.

Year.	Beef.				Mutton.				Pork.			
	Tons.	cwts.	qrs.	lbs.	Tons.	cwts.	qrs.	lbs.	Tons.	cwts.	qrs.	lbs.
1924	40	14	1	8	6	17	1	13	1	6	3	13
1925	1,184	15	1	5	7	10	1	1	—	4	1	15
1926	336	0	2	2	4	6	1	1	—	7	2	26
1927	68	8	1	4	161	10	1	19	9	2	0	14
1928	28	2	0	8	46	3	3	5	2	11	3	0
1929	22	18	1	18	178	13	0	21	2	19	0	4

TABLE SHOWING THE QUANTITY OF UNSOUND OFFAL
UTILISED UNDER SUPERVISION
DURING THE YEARS 1924 TO 1929.

Year.	Beef.	Mutton.	Pork.	Veal.
1924.....	13,468 pieces.	14,574 pieces.	4,998 pieces.	13 pieces.
1925.....	40,160 „	10,129 „	1,883 „	541 „
1926.....	13,889 „	31,217 „	1,566 „	209 „
1927.....	9,243 „	6,725 „	2,790 „	248 „
1928.....	4,034 „	52,312 „	778 „	39 „
1929.....	6,447 „	14,422 „	814 „	9 „

TABLE SHOWING THE QUANTITY AND DESCRIPTION OF UNSOUND MEATS
SUPERVISED* DURING THE YEAR 1929.

DESCRIPTION.	TOTAL WEIGHT.	CAUSE OF DESTRUCTION.					
		Tubercular.		Brine Stained, Mouldy and Decomposed.		Other causes.	
		Tons	cwts. qrs. lbs.	Tons	cwts. qrs. lbs.	Tons	cwts. qrs. lbs.
Beef	22 18 1 18	—		22	18 1 10	0	0 0 8
Mutton.....	178 13 0 21	—		50	13 2 2	127	19 2 19
Pork	2 19 0 4	—		2	18 3 24	0	0 0 8
Veal	0 17 1 25	—		0	17 1 25	—	
Total.....	205 8 0 12	—		77	8 1 5	127	19 3 7

* These were destroyed or allowed to go for industrial purposes to the satisfaction of the Medical Officer.

TABLE SHOWING THE QUANTITY AND DESCRIPTION OF OFFAL CONDEMNED DURING THE YEAR 1929.

Name of Organ.	Beef.		Mutton.		Pork.		Veal.	
	Number.	Weight, Pounds.	Number.	Weight, Pounds.	Number.	Weight, Pounds.	Number.	Weight, Pounds.
Livers...	1,072	10,594	1,849	1,904	129	395	5	15
Tongues	18	85	—	—	—	—	—	—
Hearts	395	1,521	899	251	—	—	—	—
Skirts...	1,609	2,978	—	—	—	—	—	—
Cheeks	273	612	—	—	—	—	—	—
Kidneys	1,777	1,598	742	92	—	—	4	2
Udders	—	—	—	—	—	—	—	—
Tripe	26	169	—	—	—	—	—	—
Reeds...	7	222	—	—	—	—	—	—
Tails	110	201	—	—	—	—	—	—
Feet	1,029	4,072	10,620	5,300	592	790	—	—
Plucks	—	—	—	—	61	311	—	—
Heads	—	—	—	—	2	27	—	—
Brains	—	—	312	78	—	—	—	—
Shins	—	—	—	—	—	—	—	—
Sweetbreads	60	20	—	—	—	—	—	—
Lungs...	—	—	—	—	30	58	—	—
Totals	6,447	22,072	14,422	7,625	814	1,581	9	17

Of the above were rejected for various reasons, notably, decomposition and diseased conditions, such as Cysts,

TABLE SHOWING QUANTITIES OF UNSOUND GENERAL
FOODSTUFFS UTILISED UNDER SUPERVISION DURING
THE YEAR 1929.

Description.	No. of Tins.	Weight in Pounds.	Description.	No. of Tins.	Weight in Pounds.
Canned Goods—					
Apricots ...	548	1140	Tomato Sauce	5	55
Corn Cobs ...	76	152	Tomato Paste	1	2
Fruit Salad ...	12	13	Egg Pulp ...	5643	240932
Loganberries ...	782	1564	Beef ...	738	4093
Peaches ...	756	1659	Hams ...	80	913
Pears ...	1067	1949	Tongues ...	602	3580
Milk ...	492	492	Lobster ...	8	8
Pines ...	1130	1830	Lobster Paste...	27	14
Bilberries ...	947	3233	Cray Fish ...	243	60
Tomatoes ...	32278	70777	Cod Fish ...	12	240

Description.					Packages.	Weight.			
Fruit (Fresh)—						Tons.	Cwts.	Qrs.	Lbs
Apples ...	...	...	...	...	217	12	15	3	16
,, loose ...	...	...	...	...	—	—	0	1	2
Bananas...	...	...	...	...	1832	90	12	1	14
Oranges ...	...	...	...	...	744	14	13	3	12
,, loose ...	...	...	...	...	—	237	10	0	0
Plums ...	...	...	...	...	2	0	0	1	16
Pears ...	...	...	...	...	2869	52	3	3	20
Grape Fruit ...	...	...	...	...	2189	98	6	2	2
,, loose ...	...	...	...	...	—	1	0	0	0
Lemons ...	...	...	...	...	69	1	13	3	20
Grapes ...	...	...	...	...	33	—	11	3	4
Melons ...	...	...	...	...	307	12	1	3	24

Description.				Packages.	Weight.			
Fruit (Fresh) <i>continued</i>—					Tons.	Cwts.	Qrs.	Lbs.
Melons, loose	...	...	...	—	1	10	0	0
Tomatoes	...	...	...	2	—	—	3	12
Mixed Fruit	...	...	...	5	—	—	2	24
Currants	...	...	...	50	1	2	1	8
Pea Nuts	...	...	...	622	26	1	1	22
Tiger Nuts	.	...	...	4	—	5	1	12
Cokernuts	...	...	...	238	2	15	3	6
Potatoes...	...	...	...	386	15	0	3	16
,, loose	...	...	...	—	—	8	0	0
Cabbages	...	...	...	5	—	10	0	0
Onions	...	...	...	11	—	9	3	8
Cereals—								
Wheat	...	...	...	—	332	7	2	2
Maize	...	...	...	—	193	8	3	11
Rice	...	...	...	—	15	3	0	0
Flour	...	...	...	—	1	11	2	13
Oats, loose	...	...	...	—	45	19	2	3
Rolled Oats, loose	...	...	...	—	23	18	3	1
Tapioca Flour	...	...	...	500	44	12	3	12
General—								
Bacon	...	...	...	8715 pieces	78	8	3	13
,, loose	...	...	...	—	1	4	0	23
Hams	...	...	...	19050	121	13	3	18
,, loose	...	...	...	—	6	17	3	8
Ginger	...	...	...	6	—	2	3	10
Butter, loose	...	...	...	—	—	0	1	4
Lard, loose	...	...	...	—	—	0	2	17
Ducks	...	...	...	22 birds	—	0	3	4
Sausage	...	...	...	1	—	0	2	0
,, loose	...	...	...	—	—	0	0	10
Salt Fish	...	...	...	1	—	0	2	18

TABLE SHOWING THE TOTAL QUANTITIES OF THE
DIFFERENT UNSOUND FOODSTUFFS UTILISED UNDER
SUPERVISION DURING THE YEAR 1929.

	Tons.	Cwts.	Qrs.	Lbs.
Beef Mutton, Pork and Veal...	205	8	0	12
Offal (Beef, Mutton, etc.) ...	13	19	1	19
Canned Goods... 	148	10	2	10
Fruit and Vegetables	570	16	0	14
Cereals	657	2	0	14
General (Fish, Poultry, Rabbits, etc.) 	208	10	2	13
TOTAL ...	1,804	6	3	26

Table Showing comparative Value of the more important Food Stuffs imported at the principal Ports during the year 1928.

	London. 1	Liverpool. 2	Hull. 3	Glasgow. 4	Bristol. 5	Harwich. 6	Newcastle 7	Man- chester. 8	Leith. 9	South- ampton. 10
	£	£	£	£	£	£	£	£	£	£
Animals	—	5,735,999	—	1,402,188	218,574	—	—	477,102	—	—
Butter	22,625,338	1,389,051	3,646,234	794,539	260,896	2,348,879	4,512,145	24,950	4,186,922	1,788,516
Cheese	10,608,405	1,094,886	351,491	385,914	897,577	212,299	208,955	313,874	205,562	72,359
Cocoa	1,514,387	2,053,406	447,381	31,030	320,733	169,108	7,498	—	109,483	—
Coffee	4,449,338	37,754	—	—	6,972	—	—	—	—	34,575
Grain.....	25,222,011	18,592,455	13,047,171	5,814,417	8,500,061	44	2,385,942	6,532,546	3,480,463	772,896
Eggs	8,706,228	1,400,690	1,182,586	1,090,379	—	1,223,202	1,118,180	142,722	1,669,215	1,193,804
Fish	3,605,167	3,796,557	711,302	118,987	62,950	1,549,242	1,121,250	73,684	91,465	321,231
Fruit	18,718,752	12,304,332	2,395,135	2,752,891	3,647,819	915,668	565,287	1,363,108	214,736	2,531,560
Lard	1,648,786	1,985,942	420,256	215,065	394,642	63,718	547,616	1,636,326	61,933	141,583
Margarine	1,016,983	947,417	840,863	252,989	—	480,224	186,552	258,277	504,096	—
MEAT :—										
Bacon	11,443,169	3,592,574	3,611,725	193,992	104,692	9,007,228	3,171,204	277,953	968,249	146,657
Beef	20,219,010	8,345,604	48,401	311,293	44,840	—	54,176	256,047	—	1,786,306
Hams	888,028	2,541,186	—	758,912	18,519	—	—	166,869	—	15,737
Mutton	14,031,434	4,140,843	66,753	50,808	393,711	—	—	25,683	—	618,059
Pork	423,329	406,868	—	—	—	—	—	—	—	—
Rabbits	543,095	35,945	—	—	—	—	—	—	—	—
Unenumerated.....	868,676	418,762	165,193	384,758	137,152	76,758	208,108	—	102,709	135,553
Preserved	4,177,223	1,240,491	49,628	—	2,158	—	—	—	—	—
Milk, Condensed	2,890,486	622,038	468,693	18,515	206,230	—	444,301	341,137	142,742	40,493
Poultry and Game	1,330,176	72,548	22,438	—	—	244,864	—	—	—	177,598
Sugar.....	13,161,696	9,643,983	506,041	609,126	331,265	27,081	225,043	263,866	508,258	91,044
Vegetables	3,829,813	2,383,747	1,045,287	308,128	201,630	372,169	304,344	225,930	308,882	2,272,980

The Port Sanitary Authority is also engaged in the issue of certificates of disinfection for foreign governments and other purposes in connection with the exportation of wool, jute sacks and cloth, tailors' cuttings, rags, second-hand bags and clothing, bales of cotton, etc.

The department also endorses under the United States, Canadian and other regulations, certificates regarding wholesomeness of food articles, and the sanitary conditions of the premises in which the articles were produced or stored, comprising poultry, game, cheese, bacon, hams, potatoes, preserved fish, pickled beef, tongues, sausage skins, lime juice, etc. The work attached to preparing and recording these certificates is considerable, and takes up a large amount of time of the department.

The Medical Officer to the Port Sanitary Authority desires to express his appreciation of the valuable assistance received from H.M. Collector of Customs and staff, the Mersey Docks and Harbour Board and their officers, and the various shipping companies who have co-operated with the Port Sanitary Authority in the maintenance of Public Health and the prevention of disease in the port. The Consular Bodies have at all times given courteous assistance.

A. A. MUSSEN, M.D.,

Medical Officer of Health,

Port Sanitary Authority.

MUNICIPAL OFFICES,

LIVERPOOL,

21st March, 1930.

